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Quality program induced change: its impact on stress, fear and anxiety

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Quality program induced change: Its impact on stress, fear and anxiety

by

Chester Douglas Ward

A dissertation submitted to the graduate faculty

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This is to certify the Doctoral dissertation of

Chester Douglas Ward

has met the dissertation requirements of Iowa State University

Signature was redacted for privacy.

Maior Professor

Signature was redacted for privacy.

For the Major Program

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For the Graduate College

DEDICATION

To the memory of Nancy:

In memory of your unconditional love. I could never have gone the distance had it not been for your encouragement during a very difficult time in our lives.

To the memory of Dad:

It was your encouragement from the very beginning of my school years that created the academic focus in my life and your personal sacrifice that made it possible for me to achieve this milestone in my life.

To Joe:

You are truly a blessed son. Thank you for your patience during this undertaking that has delayed some of the more fun things we hope to do.

To Linda:

You bring a newfound delight to my life. Your support and encouragement have meant more than you can imagine.

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ABSTRACT

Organizational change has historically been a stimulus for increased fear/anxiety. A precept of quality movement intervention, as conceived by Deming (1986), is that if the intervention is properly implemented there will be less fear within the organization. This investigation assesses the impact of level of quality program implementation, sex, years of employment (tenure), years of formal education, organization size, individual's age and job type on the level of fear/anxiety within the studied organizations. The level of quality program implementation was determined using an instrument developed for the purposes of this study. Fear/anxiety were assumed to be sufficiently correlated to occupational stress to allow use of the Job Stress Survey (JSS) for data collection. Data were collected from 1796 respondents in twenty-two organizations that had participated or were participating in a continuous quality improvement education program.

Findings included:

- Level of quality implementation or the sex of the respondent did not have an impact on the level of fear/anxiety in the studied organizations.
- Organization size, years of employment, years of education, age and job type were all significantly related to the level of fear/anxiety in the studied organizations.
- The supervisor had a higher level of stress than the other four job types (manager, professional, clerical, worker).

Conclusions and recommendations include:

- The finding with regard to level of quality implementation should not necessarily be taken as evidence that there is no relationship between level of quality implementation and fear/anxiety within individual organizations. Since there was no control group

available, the instrument used to assess the level of quality implementation may not have had sufficient face validity and rater reliability.

- The demographics found to affect fear/anxiety levels should not be ignored when considering organizational change.
- Future research is needed to assess methodologies and procedures used to evaluate the interactions between variables without their being confounded by multicollinearity.
- Further research is needed to assess the reasons for the difference in the level of fear/anxiety experienced by those in supervisory positions.
- Separate training programs should be considered for supervisors when implementing programs that involve organizational change.

CHAPTER 1. INTRODUCTION

An effective organization "...is not a stable solution to achieve , but a developmental process to keep active" (Robbins, 1990, p.382). Philip Crosby in his book The Eternally Successful Organization (1988) says the following about change:

> Every business changes every day in some way. The successful ones learn how to recognize and even create these changes. (p. 19)

Beneficial change within an organization is the direct result of learning and gaining knowledge about an organization and the people operating it either as managers or as workers (Delavigne & Robertson, 1994).

Change is not always beneficial or productive. Change can simply happen or it can be the byproduct of an organizational plan. The organizational plan would suggest that change is implemented for a reason or for several reasons. Figure 1.1 depicts how planned interventions create a changed organization.

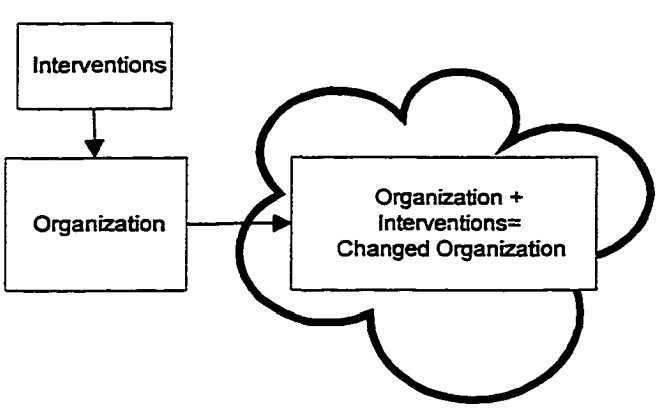

Figure 1.1: Depiction of the impact of interventions on an organization

Value added concepts (Womack & Jones, 1996) have shown that change is most often the outcome of an organizational need to reduce cost, reduce cycle time, or to improve quality. The current study is directed at change implementation for the purpose of improved quality. The planned change developed for the purpose of improving quality is an outcome that results from the implementation of strategies or processes that leaders use to achieve organizational improvements or at least to achieve results that show improved organizational performance as measured by the traditional "bottom line", profitability. Change that brings organizational improvement, even though well planned, affects individuals within the organization in different ways (O'Toole, 1995). In fact, according to Dettmer (1997) what may be considered as an improvement to one individual may simply be a "change" to another. This dichotomy creates organizational apprehension that does not subside. The prospect that the outcome could vary is consistent with the idea that individuals behave differently toward change when functioning in groups (O'Toole, 1995). Because of the significant impact that change has on both organizational and individual performance, choosing the right "change strategy" has become a key component in the process of organizational improvement. The most well known and effective change strategies are explained in the following paragraphs.

"Reorganization", "Total Quality Management", "Quality Function Deployment", "Quality Policy Deployment", and "Reengineering Implementation" are among the many recent attempts to implement change that would improve the ability of an organization to provide high quality services or products, a discussion of which follows.

- Reorganization is an attempt to improve the functioning of an organization. It typically is the methodology used to change the reporting structure within an organization by either adding or removing layers of management. Reorganization could also mean movement from one structural format to another, such as changing from a bureaucratic structure to a divisional structure (Robbins, 1990).
- Total Quality Management (TQM) is a mass movement philosophical change that is intended to impact every part of an organization (Shiba, 1990). TQM is not intended to be a quick fix for organizational ills. It would, if allowed to become part of the culture embodied in organizations, bring about changes in the capability of the organization to meet the needs of its customers. In order for TQM to become an effective component of the organizational philosophy it must be planned before it is implemented. Quality Function Deployment (QFD) and Quality Policy Deployment (QPD) are methodologies that are available to support this planning process (Shiba, 1990).
- Quality Function Deployment (QFD) is a "planning process" (Day, 1993). It is a methodology that can be used to help organizations make effective use of quality programs, like TQM. The QFD process has customer satisfaction as its focus and involves the customer from the beginning of the product or service development to the time it is delivered. The customer is the input to the QFD process and the output is the selection of those specific items that lead to complete customer satisfaction. QFD itself is not an organizational change. It is a change in the "way" organizations plan for change, so that the customer becomes or is the primary component at the developmental level (Day, 1993).

- Quality Policy Deployment (QPD) could be an integral part of making any organizational change a success. The purpose of QPD is to provide management with procedures that could be utilized to implement policy changes in a way that would provide the least resistance and the greatest effectiveness. Linked very closely with QFD, QPD is an implementation tool that is available for the planning/development of a program of phased change that is not disruptive to the functional capability of the organization (Sheridan, 1993).
- Reengineering is the "starting over" philosophy of organizational change. Unlike TQM that functionally maintains the structure of the organization while significantly changing "how" the organization performs, the reengineering approach is one of complete change (Joiner, 1994). Joiner, in his book Fourth Generation Management, said that "...all change is ultimately social change" (p 201). This supports an earlier concept that change, if intended to improve the organization, does not happen quickly and requires a great deal of planning before implementation (Joiner, 1994).

Individuals react to the implementation of these change strategies in different ways with the key to acceptance being based essentially on how well the need for, and the benefits arising from, the change are communicated to the employees. Rogers (1995) in his book Diffusion of Innovations defines diffusion as "...the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). It is this special type of communication that plays a particularly pivotal role in the acceptance of new ideas or changes within an organization. Frequently companies do not adequately evaluate this need for special communication and the reactions to new ideas or

changes manifest themselves in the form of employee stress and ultimately fear/anxiety. It is important to consider this impact on employees during the change process as well as the need for the employees to feel "psychologically safe" (Schein, 1993). If it is not clear to the employees that the change is to their benefit and not threatening, their opposition to change will make it practically impossible to accomplish. A major component of this philosophy of change is the removal (reduction) of fear in the workplace (Deming, 1986).

W. Edwards Deming (1986), in his book Out of the Crisis, wrote:

> No one can put in his best performance unless she (he) feels secure. *Se* comes from Latin, meaning without, *cure* means fear or care. Secure means without fear, not afraid to express ideas, not afraid to ask questions. Fear takes on many faces. A common denominator of fear in any form, anywhere, is loss from impaired performance and padding figures. Another loss from fear is the inability to satisfy specified rules, or the necessity to satisfy, at all costs, a quota of production. (pp. 59, 62)

In order to drive out fear, Deming suggests that class distinction must be eliminated, rumors must be discontinued, employees must not be blamed for faults of the system, people must be made to feel "okay" about making suggestions and people must be able to question work methods and purposes without fear of reprisal.

There is no universally accepted clinical definition of fear when applied to the workplace. Clearly though there is more than one kind of fear, including, biological (physical) fear and psychological (emotional) fear. This emotional fear can be caused by internal or external stimuli and when internally imposed is conducive to personal growth (Ryan and Oestreich, 1991). Aaron T. Beck and Gary Emery (1985), in their book Anxiety Disorders and Phobias, make the following distinction between fear and anxiety:

> Anxiety may be distinguished from fear in that the former is an emotional process while fear is a cognitive one. Fear involves the intellectual appraisal of a threatening stimulus; anxiety involves the emotional response to that appraisal. When a person says he fears something, he is generally referring to a set of circumstances that are not present but may occur at some point in the future. When a person has anxiety she experiences a subjectively unpleasant emotional state characterized by unpleasant subjective feelings such as tension or nervousness and by physiological symptoms like heart palpitations, tremor, nausea, and dizziness. A fear is activated when a person is exposed, either physically or psychologically, to the stimulus situation he considers threatening. When the fear becomes activated, he experiences anxiety. Fear then, is the appraisal of danger; anxiety is the unpleasant state evoked when fear is stimulated. (p. 9)

Given this distinction between fear and anxiety, it is intuitive that W. Edwards Deming, as quoted above, was addressing fear in the cognitive sense as well as the anxiety that would normally be expected to accompany it. In Out of the Crisis (Deming, 1986) the word "fear" is defined through the use of numerous examples that demonstrate the outcome of "fear" in the workplace. The outcome of his examples compare quite favorably to those offered by other authors in their description of occupational stress. For example, Peter Vagg and Charles Speilberger in their article "Occupational Stress: Measuring Job Pressure and Organizational Support in the Workplace" (1998) emphasize that outcomes such as reduced productivity, absenteeism, and individual health problems are directly related to occupational stress in the workplace. It is therefore appropriate to suggest that understanding occupational stress as it relates to the workplace is equivalent to understanding the impact of fear.

Because fear is so difficult to define it is instead considered to be an outcome of stress (Motowidlo, Packard, & Manning, 1986) along with other elements such as "anxiety, irritation, annoyance, anger, sadness, grief, and depression". Stress being defined as "designating a broad class of events involving interaction between extreme environmental

stimuli and the adaptive capabilities of the organism" (Janis and Leventhal, 1968, p. 1042). Richard Lazarus in his book Psychological Stress and Coping Stress (1966) went beyond the typical analytic definition to define the "stress process" as consisting of stressors, mediating cognitive appraisals of threat and emotional reactions determined by how stressors are perceived and/or appraised. This approach is quite appropriate in the organizational setting. Further, stress as applied to the workplace is occupational stress (Speilberger, 1986). In this special case the stressor or stress process is derived from on-the-job situations that are perceived as physically or psychologically threatening. The stress then evokes an anxiety reaction much like that described as coming from fear by Beck and Emery (1985). It is important to understand that this is one of the many definitions of occupational stress and that like fear, stress is equally difficult to define depending quite often on the model or instrument used to measure it (Vagg & Speilberger, 1998). Testing has shown that exposure to varying degrees of stressful events may cause anxiety (Kaplan & Saccuzzo, 1997) that is manifested by "...an unpleasant emotional state marked by worry, apprehension, and tension" (Kaplan & Saccuzzo, 1997, p. 488).

Job conditions have historically had an impact on stress, and similarly, individual characteristics that have been learned or in some manner ingrained in the individual are contributors to stress. The frequency of stressful events derived from job conditions and individual characteristics combine with the intensity of stressful events imposed by job characteristics to create some degree of subjective stress. Job pressure and organizational support in the workplace (Vagg & Speilberger, 1998) have been found to be key contributors to the level of occupational stress experienced by individuals. Stress or the perception of an

event that causes stress leads, therefore, to some level of fear which may or may not have an impact on personal performance depending on the psychological capacity of the individual(s) involved. Vagg and Spielberger (1998) state that "...ratings of perceived severity of specific work stressors provide information about the impact of the stressor events on a worker's emotional state at that particular moment" (p. 298). The emotional state could be appropriately equated to the level of fear felt at a particular moment. The model inputs, Figure 1.2, adapted from the Motowidlo, Packard, & Manning (1986) model suggest that there are both individual and organizational (job conditional) inputs that represent the primary sources of stress. An early version of this model, Cohen (1980), suggests that cognitive fatigue related to stress results from information overload generated from

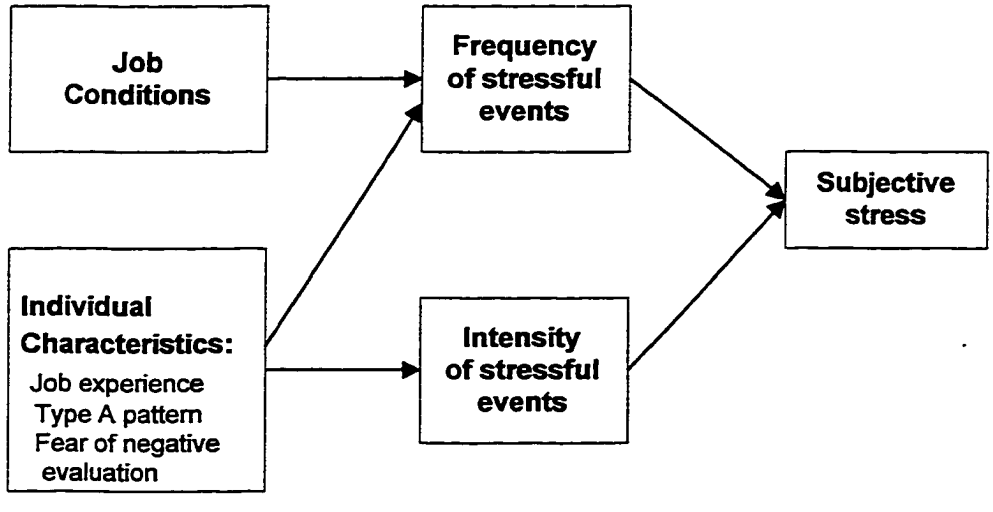

Figure 1.2: Preliminary model representing the inputs to stress
Note: From "Occupational Stress: Its Causes and Consequences for Job Performance", by S. J. Motowildo, J.S. Packard, and M. R. Manning, 1986, Journal of Applied Psychology, 71 (4) p.619.

individual involvement in organizational change. This demonstrates that after experiencing certain stressors individuals were less able to perform effectively and resulted in a "...decrease in helping, a decrease in recognition of individual differences, and an increase in aggression" (Cohen, 1980, p 95). Further research led to modifying the model (Motowidlo, Packard, & Manning, 1986) in a way that presumes subjective stress, instigated by work related events, causes "...affective states such as anxiety, hostility, and depression..." (Motowidlo, Packard, & Manning, 1986, p 618) with job performance decrements as the measure of the ultimate outcome. These decrements are consistent with Deming's concept of the impact of fear on organizations that could drive employees to avoid confrontation with supervisors by false reporting and quota compliance (Deming, 1982). In

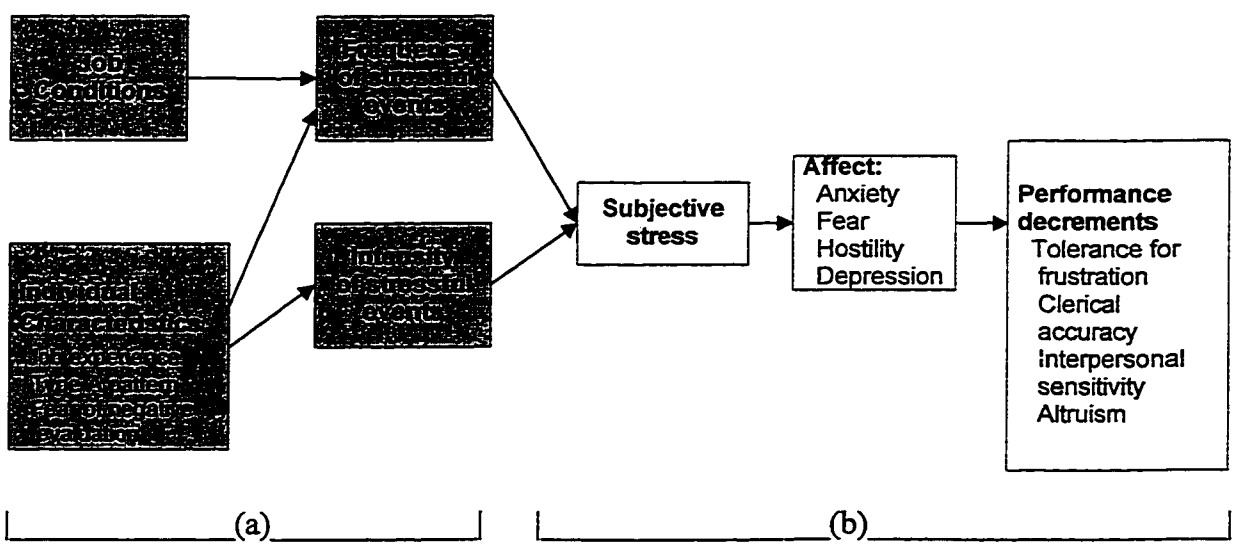

Figure 1.3: Preliminary model of the causes of occupational stress and its consequences for job performance

Note: From "Occupational Stress: Its Causes and Consequences for Job Performance", by S. J. Motowildo, J.S. Packard, and M. R. Manning, 1986, Journal of Applied Psychology, 71 (4) p.619

their model, Figure 1.3a, Motowidlo, Packard, & Manning (1986) suggest that subjective stress is the direct result of the frequency and intensity of stressful events generated by job conditions and certain individual characteristics. Vagg and Speilberger (1998) additionally emphasize the importance of organizational support when considering the frequency and intensity of stressful events. Job experiences, Type A behavior[1] patterns, and fear of negative evaluations are key contributors depicted in the model. Individuals who are obsessed with time urgency, are excessively competitive, and are extremely aggressive, would typically be characterized as having a Type A behavior pattern. While the Type A behavior pattern normally implies a more aggressive approach to dealing with change, such people, according to some research (Greenglass & Burke, 1991) may give up and become helpless or may in fact not be able to adapt at all (Greenglass and Burke, 1991).

It is suggested that this stress comes in part from job conditions created by variability in work practices or processes (Schein, 1993) that result in a condition of learned anxiety. This variability can be attributed to any of a number of elements that have an impact on the job conditions. Examples of these elements, in a very broad sense, can be categorized using people, methods, machinery, material, or the environment (physical and psychological). Similarly, when considering the individual characteristics (Motowidlo, Packard, & Manning, 1986) they may bring fear/anxiety to the workplace as the result of the same impacting elements affecting individual characteristics.

Attempts to measure fear are compounded by the numerous ways that it manifests

[1] Type A behavior is behavior that includes impatience, aggressiveness, competitiveness, and a strong sense of urgency in overcoming impediments to job performance (Ivancevich & Matteson, 1984).

itself in organizations. One way is reflected in the level of stress that exists. Stress manifests itself, Figure 1.3b, in the form of individual or personal characteristics such as anxiety, hostility, and depression. The effects of stress and ultimately fear/anxiety are manifested by performance decrements that are reflected in a reduced ability to deal with frustration, reduced accuracy in job performance, and poor interpersonal relations skills (Motowildo, Packard, & Manning, 1986). The fact that any of these three decrements might be reflected in an evaluation may have a negative connotation and hence another stressor or added basis for fear.

Motowildo, Packard, and Manning (1986), utilize three separate path analyses and conclude that there are three applicable strategies that could be utilized to reduce stress and its negative affect on job performance. The first two of these strategies are consistent with Deming's ideas as stated in his Fourteen Principles (Walton, 1986). The strategies are:

1. Change the job conditions to eliminate unnecessarily stressful events or at least to make them less frequent.
2. Change the distribution of individual characteristics associated with stressful event frequency and intensity either by (1) selection programs that filter out characteristics likely to lead to high levels of stressful event frequency[2] and intensity, (2) placement programs that assign persons with least stress-resistant characteristics to the least stressful job situations, or (3) training programs that help people behave in ways that cause stressful events and less likely to react

[2] The model did not show any causation between the frequency of stressful events and their subjective intensity, but there was an observed correlation ($r=0.27$, $p<0.01$) (Motowildo, Packard, and Manning, 1986).

strongly to such events when they occur.

3. Deal directly with depression. (p. 627)

The model suggests that when the *status quo* is disturbed by change, i.e. an external or internal event such as the implementation of a quality change program with the intention to reduce fear, fear may actually increase. This increase in fear may be temporary and based on the extent of the quality program implementation process. It may eventually be demonstrated that quality initiatives that lead to organizational change could be instrumental in reducing employee fear/anxiety within organizations.

Statement of the Problem

Organizational change is known to generate stress and possibly fear/anxiety in employees (Tosi, Rizzo, & Carroll, 1986). A precept of quality improvement programs is to eliminate employee fear as an impediment to improved quality in products and services. The problem addressed by this study is that the impact of quality improvement program implementation on employee fear/anxiety has not been adequately investigated.

Purpose of the Study

The purposes of the study are:

1. to determine the impact of the Center for Continuous Quality Improvement (CCQI) quality improvement program implementation on fear/anxiety in organizations.
2. to identify which of the studied variables (level of quality implementation, sex, years of formal education, years of employment with the organization, organization size, age of respondent and job type) significantly influence the level of fear/anxiety in organizations that are or have been involved in the CCQI quality improvement education process.

Research Questions

1. Considering organizational change to be a part of the quality improvement program, does the CCQI intervention have an impact on fear/anxiety at various levels of quality program implementation?
2. Independent of the CCQI intervention process, which of the following independent variables have an impact, either individually or interactively, on fear: level of quality implementation; sex of the respondent; years respondent has been employed by the organization; organization size; age of the respondent; years of education; type of job?

Research Hypotheses

The seven independent variables in this study are: (1) level of quality implementation; (2) sex of the respondent; (3) years employed by the organization; (4) organization size; (5) age of the respondent; (6) years of education; and (7) job type. The dependent variable is organizational fear/anxiety (occupational stress). The general hypotheses are described below:

1. Null Hypothesis 1: There is no significant correlation between the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS) and the level of quality implementation given the other variables (sex, years of employment, organization size, age of the respondent, years of respondent education and job type) in the model.

   Alternative Hypothesis 1: Level of quality implementation, given the other variables (sex, years of employment, organization size, age of the respondent, years of respondent

education and job type) in the model, will have a significant correlation with the level of organizational fear/anxiety, as measured by the JSS.

2. Null Hypothesis 2: There is no significant difference in the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS), for males and females given the other variables (level of quality implementation, years of employment, organization size, age of the respondent, years of respondent education and job type) in the model.
   Alternative Hypothesis 2: The sex of the respondent, given the other variables (level of quality implementation, years of employment, organization size, age of the respondent, years of respondent education and job type) in the model, will make a significant difference in the level of organizational fear/anxiety, as measured by the JSS.

3. Null Hypothesis 3: There is no significant correlation between the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS) and the number of years the respondent has been employed by the organization given the other variables (level of quality implementation, sex, organization size, age of the respondent, years of respondent education and job type) in the model.
   Alternative Hypothesis 3: Years of respondent employment with the organization, given the other variables (level of quality implementation, sex, organization size, age of the respondent, years of respondent education and job type) in the model, will have a significant correlation with the level of organizational fear/anxiety, as measured by the JSS.

4. Null Hypothesis 4: There is no significant difference in the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS), for large and small organizations given the other variables (level of quality implementation, sex, years of employment, age of the respondent, years of respondent education and job type) in the model.
   Alternative Hypothesis 4: Organization size, given the other variables (level of quality implementation, sex, years of employment, age of the respondent, years of respondent education and job type) in the model, will make a significant difference in the level of organizational fear/anxiety, as measured by the JSS.

5. Null Hypothesis 5: There is no significant correlation between the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS) and the age of the respondent given the other variables (level of quality implementation, sex, years of employment, organization size, years of respondent education and job type) in the model.
   Alternative Hypothesis 5: Age of the respondent will, given the other variables (level of quality implementation, sex, years of employment, organization size, years of respondent education and job type) in the model, have a significant correlation with the level of organizational fear/anxiety, as measured by the JSS.

6. Null Hypothesis 6: There is no significant correlation between the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS), and the number of years of respondent education given the other variables (level of quality implementation, sex, years of employment, organization size, age of the respondent and job type) in the model.

Alternative Hypothesis 6: The number of years of respondent formal education will, given the other variables (level of quality implementation, sex, years of employment, organization size, age of the respondent and job type) in the model, have a significant correlation with the level of organizational fear/anxiety, as measured by the JSS.

7. Null Hypothesis 7: There is no significant difference in the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS), for the various job types given the other variables (level of quality implementation, sex, years of employment, organization size, age of the respondent and years of respondent education) in the model.
   Alternative Hypothesis 7: The respondent's job type will, given the other variables (level of quality implementation, sex, years of employment, organization size, age of the respondent and years of respondent education) in the model, make a significant difference in the level of organizational fear/anxiety, as measured by the JSS.

Assumptions of the Study

The following assumptions were made in this study:

1. For the purposes of this study occupational stress is considered to be sufficiently correlated to fear, as defined by Deming (1986), to allow them to be treated as a single dependent variable.
2. There were no trainer effects on organizational fear. Delivery of material by CCQI associates or organizational employees educated in consistent delivery methods and material provided by CCQI minimized any possible variability.

3. The survey was explained to all respondents by the researcher, a CCQI associate, or a CCQI trained facilitator to establish a consistent knowledge level concerning the purpose of the study.
4. All respondents were able to read and understand the questions being asked.
5. All respondents were asked to complete the survey during normal working hours in a comfortable place to avoid any employee fear that might be induced by unfamiliar surroundings.
6. The indirect CCQI intervention process was conducted by individuals who had been provided detailed education in the CCQI education materials and delivery methodology.
7. Any CCQI direct or indirect quality intervention was considered to have an impact on organizational fear/anxiety.
8. This study assumed that the instrument utilized for measurement purposes could not differentiate between anxiety, fear, and occupational stress.
9. This study assumed that the CCQI associates could effectively assess the level of quality implementation achieved by an organization.
10. Variables not accounted for in the study, which might effect the results, were randomly and uniformly distributed across the sample.

Limitations of the Study

This study was conducted with the following limitation:

1. This study assumed that the leadership (president, CEO, etc.) of organizations with participating employees was effectively involved in the quality improvement process.

Delimitations of the Study

The following delimitations were important to interpret and understand the conclusions and recommendations of this study:

1. The Center for Continuous Quality Improvement was the only organization providing or had provided in-depth quality education to the employees of the organizations studied.
2. The CCQI direct and indirect education intervention processes were not limited to any particular level of training.

Procedure of the Study

The major procedural steps used to develop the methodological components of this study are as follows:

1. Completed a literature review to develop the concept and structure of the study.
2. Presented a proposal with Chapters 1, 2 and 3.
3. Identified the Job Stress Survey (JSS), (Appendix A), and obtained permission to use the JSS for data collection (Appendix B).
4. Modified the JSS instructions to allow for computer scoring (Appendix C).
5. Secured permission to collect data. (Human Subjects Review Committee) (Appendix D).
6. Identified the population and sample to be utilized for the field study from organizations that are receiving or have received quality program education from CCQI and control group organizations that have received no externally provided quality program training.
7. Developed the Organization Quality Program Implementation Assessment (OQPIA), (Appendix E), to assess the level of quality program implementation based on the seven

dimensions of the 1999 Malcolm Baldrige National Quality Award and the quality education format provided by CCQI.

8. Secured permission from organizations to collect data (Appendix F).
9. Administered the JSS to employees of participating organizations.
10. Analyzed the computer scored data using the Statistical Analysis System (SAS).
11. Developed conclusions regarding the relationship between fear/anxiety, as measured by the JSS, and level of quality program implementation, sex, years of employment with the organization, years of formal education, organizational size, job type, and respondent age. This included a prediction equation using the statistically significant independent variables.
12. Reported the results.

Definitions

Anxiety - an affective state that results from stress generating situations. "A tense emotional state often marked by such physical symptoms as tension, tremor, sweating, palpitation and increased pulse rate" (Beck & Emery, 1985, p. 8).

Communication - a process in which participants create and share information with one another in order to reach a mutual understanding (Rogers, 1995, p. 6).

Compatibility - the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters (Rogers, 1995, p. 15).

Complexity - the degree to which an innovation is perceived as difficult to understand and use (Rogers, 1995, p. 16).

Diffusion - the process by which an innovation is communicated through certain channels over time. It is a special type of communication, in that the messages are concerned with new ideas (Rogers, 1995, p. 5).

Employee Fear - an employee's threatened feeling of what might result from a given set of circumstances derived from a combination of job conditions and individual characteristics either of which may or may not be changing.

Fear - a cognitive process as opposed to an emotional one that refers to "the appraisal that there is actual or potential danger in a given situation" (Beck & Emery, 1985, p. 8).

Information - a difference in matter-energy that affects the uncertainty in a situation where a choice exists between a set of alternatives (Rogers, 1995, p. xvii).

Innovation - an idea, practice, or object that is perceived as new by an individual or an organization with a new alternative or alternatives (Rogers, 1995, p. xvii).

Job conditions - a set of parameters relative to a particular job that can be measured by comparing perceived to documented expectations (Motowildo, Packard, & Manning, 1986).

Kaiser's measure of sampling adequacy (MSA) - MSA is a measure of whether the distribution of values is adequate for conducting factor analysis. Values greater than 0.9 can be considered to be marvelous, greater than 0.8 meritorious, greater than 0.7 middling, greater than 0.6 mediocre and greater than 0.5 miserable. Values less than 0.5 are unacceptable and require remedial action, either by deleting the offending variable or including other variables related to the offenders.

Observability - the degree to which results of an innovation are visible to others (Rogers, 1995, p. 16).

Occupational stress - a special case of stress that is applied in the workplace where the stress or stressor is derived from on the job situations that are perceived as physically or psychologically threatening.

Planned interventions - interventions that are implemented to guide an organization through a change or series of changes.

Reinvention - the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation (Rogers, 1995, p. 17).

Relative advantage - the degree to which an innovation is perceived as better than the idea it supersedes (Rogers, 1995, p. 15).

Stress - stress is an emotional experience often considered to be negative and typically resulting in less than adequate job performance (Motowidlo, Packard, & Manning, 1986). Two types of stress, somatic and psychological, should be assessed when considering organizational changes (Thomas and Ganster, 1995).

Somatic Stress - the physical symptoms of psychological stressors in the environment influenced by organizational change, personal perception of role conflict, and organizational security (Saifer, VanderWielen, & Nebecker, 1995).

Psychological Stress - (subjective stress) - emotional problems such as anxiety, depression, frustration, and tension (Donovan, 1987).

Subjective stress - also defined by Motowildo, Packard, and Manning (1986) as "an unpleasant emotional experience with elements of fear, dread, anxiety, irritation, annoyance, anger, sadness, grief and depression"

Trialability - the degree to which an innovation may be experimented with on a limited basis (Rogers, 1995, p. 16).

Type A behavior - a type of behavior that includes impatience, aggressiveness, competitiveness, and a strong sense of urgency in overcoming impediments to job performance (Ivancevich & Matteson, 1984).

Uncertainty - the degree to which a number of alternatives are perceived with respect to the occurrence of the relative probabilities of these alternatives. Uncertainty motivates an individual to seek information (Rogers, 1995, p. xvii).

Unplanned interventions - interventions or elements of an organization that are functionally not part of the change process that has been guided or directed. People (employees) or external influences are key examples of these interventions.

CHAPTER 2. REVIEW OF LITERATURE

This study is concerned with determining the impact of quality improvement program implementation on employee fear and its corollary, occupational stress. Quality improvement program implementation is a change that is being widely used today to take steps to achieve the innovations addressed by Nonaka and Takeuchi, (1995). This chapter begins by discussing an historical overview of organizational change, the reasons for change, the major theories or techniques used to bring about change, the intervention considered to be the source of change in this study and the historical basis for the relationship between fear and organizational change. Included also are the common elements utilized in quality program implementation that could be instituted to drive out fear. The concept of fear is defined along with a listing of factors that affect fear and its dynamic performance over time. W. Edwards Deming's practical definition of fear in his book Out of the Crisis (1986) made it possible to use the measurement of occupational stress as a means to assess the level of fear. Several models from previous studies were reviewed to assess the implication of quality program implementation along with a discussion of which has the most potential for future application.

Historical Overview of Organizational Change

Over one hundred and fifty years ago some of the people of this country set out on a journey of more than 2000 miles from Missouri to Oregon. Their vision was one of change, change that they hoped would bring about a better future for them and their families. They didn't know what it would be like on the way, nor did they know what it would be like when they got there. What they knew for certain was that they wanted to leave what was familiar

to them for something different. They wanted change. These people were the pioneers and what they did was change this country forever by settling the West. Organizational change today parallels, in many ways, the challenges that those early pioneers faced in settling the West.

The art of progress is to preserve order amid change
and to preserve change amid order.

Alfred North Whithead

One of the best known early applications of this relationship between progress and change came with the advent of scientific management and the ideas of Frederick W. Taylor. In Toffler's (1980) terms Taylorism brought on the second wave of change. This second wave moved the world beyond the first wave of change, which had been ushered in thousands of years before with the "invention" of agriculture. The first wave of change (Toffler, 1980) created an agricultural society that was family based deriving its livelihood from the family unit where education, entertainment, religion, etc. revolved around the family. The appeal of scientific management was directly related to an effort to improve employer-employee relations by a method of impartial systemization. Taylorism promoted a detailed job analysis that "scientifically" determined a set of standardized time and output requirements (Marcus & Segal, 1989). Several of Taylor's disciples, Carl Barth, Henry Gantt, and Frank Gilbreth, were all instrumental on their own in keeping scientific management alive and successful in its time through their contributions to the concept of scientific management. Carl Barth contributed his ideas of factory management and improved industrial efficiency using time studies as a basis for rate setting (Babcock, 1917). Henry Gantt added charting techniques that were used for scheduling production activities and statistical sampling for rate control

and work quality (Shrode & Voich, 1974). Frank and Lillian Gilbreth, proponents of the "one best way" to study the methods of how to perform tasks more efficiently, made timely contributions to the Taylorism and scientific management. The changes brought about by Taylorism certainly were instrumental in transforming American industry from craft production to mass production (Delavigne & Robertson, 1994) and to large organizations. This second wave brought with it dramatic changes in the family unit which necessitated the institutionalization of public education and began changes in the family structure that are continuing today. Though rudimentary in its beginnings the efforts to bring about organizational change in those early years served as the impetus for the frequent philosophical shifts evident in more recent years. The early attempts at scientific management and the subsequent minor modifications that had improved productivity as their ultimate goal typically ignored the employee. Delavigne and Robertson (1994) suggested that the following list of eight flaws of scientific management were significant, but not recognized at the time.

1. Belief in management control as the essential precondition for increasing productivity.
2. Belief in the possibility of optimal processes.
3. A narrow view of process improvement.
4. Low-level sub-optimization instead of holistic, total-system improvement.
5. Recognition of only one cause of defects: people.
6. Separation of planning and doing.
7. Failure to recognize systems and communities in the organization.
8. View of workers as interchangeable bionic machines.

(p. 24)

Each of these, while seen as key components of Taylorism, are in direct conflict with the principles established by Deming (Delavigne & Robertson, 1994).

The evolution of organizational change from the late 1800's has not been as truly dramatic as it may seem. Moving through three different management styles; management by doing, management by directing, and management by results, this country has come to depend on competition as the primary model for change and learning (Chawala & Renesch, 1995). While competition has been instrumental in bringing greatness to this country, it has contributed to an increasingly less cooperative environment that is detrimental to the effective implementation of organizational change. Dependence on competition is but one example of where Taylorism and its flaws exist in organizations today.

The new knowledge of the twentieth-century generated by individuals like Albert Einstein, C. I. Lewis, and Walter Shewhart (DeVor, Chang, & Sutherland, 1992) provided the impetus for a paradigm shift in the philosophy of management. W. Edwards Deming took his knowledge of statistics and went to Japan at the end of World War II to aid in rebuilding that country. It wasn't long until Japan and quality became synonymous (Deming, 1986). Until America realized that it was deeply involved in a new economic age created by Japan, no real philosophical change with respect to quality occurred in the United States (Deming, 1986). In 1980, with the beginning of the quality movement in America, a new management vocabulary was created (Walton, 1986). This vocabulary written by such men as Philip Crosby (1979), W. Edwards Deming (1986), Brian Joiner (1995), and Joseph Juran (1995) to name only a few, brought ideas like: management by method, theory of constraints, profound

knowledge, principle centered leadership, statistical process control, systems theory, and reengineering into everyday use in America and around the world.

"Two hundred years ago, in his book The Wealth of Nations (1776), Adam Smith (1723-1790) observed that the division of labor increases efficiency because: (1) workers can improve their dexterity; (2) less time is wasted in switching tasks; (3) proper technology can be implemented more effectively within each operation." (Delavigne & Robertson, p.58, 1994). These concepts, it could be argued, are true today and form an integral part of the ideas of many of the leaders of change.

The Reasons for Change

Organizational change has been treated as an accidental occurrence in some organizations (Robbins, 1990), but most organizational leaders see the objective of planned change as a way to stay current/competitive in an ever changing world. Stephen Robbins in his book Organization Theory, wrote:

> As long as organizations confront change--current products and services reach maturity in their life cycles and become obsolete; competitors introduce new products or services; government regulations or tax policies affecting the organization are changed; important sources of supply go out of business; a previously non-unionized labor force votes for union representation--the organization either responds or accepts the inevitable decline in business. (p. 383)

Some would see this planned change referred to by Robbins (1990) as too methodical, giving the appearance that change is always very structured and like an engineered process that is driven into an organization without resistance (Chawala & Renesch, 1995). According to Chawala & Renesch (1995), "...managing change means managing resistance..." (p. 157) and as organizations open the dialogue with their employees situations are conceived that eliminate the resistance to change. In order to understand how to eliminate the resistance to

change, the resistance to change or the source of the resistance must be understood. James O'Toole in Leading Change (1995) suggests that organizational culture and values of the western society are the two "potent sources of resistance to change" (O'Toole, 1995, p. 8). Cultures are formed over decades and once established are very difficult to change. A major reason for this difficulty lies directly with the employees who have become committed to the organization over a long period of time (Robbins, 1990) and who are hesitant to risk change. Despite this resistance to change, change happens, planned or otherwise.

Organizations change for many reasons. W. Edwards Deming said that organizations changed for three profound reasons that relate to the following: (1) increasing affordable growth rate; (2) increasing quality and productivity; (3) learning new knowledge faster (Delavigne & Robertson, 1994). Organizational survival may be the basis for change in an extremely competitive environment that involves a rapidly growing technology or simply a directional change to move to a less volatile environment to preserve the foundational components of the organization (Chawala & Renesch, 1995). The need to remain competitive may be the most basic of any of the reasons for change. Remaining competitive could mean anything from implementing continuous quality improvement programs to achieve a level of quality that meets or exceeds customer expectations to increasing output from a product or service line to meet customer needs (Chawala & Renesch, 1995). While competition may be considered to be the general reason for change, the ultimate or specific reasons are directly related to the leadership style of upper management. There is a logical connection between organization size, formalization, and leadership style. In small organizations that have very few employees the leadership style is likely to be one of

management by doing with high formalization. As organizations grow in size the next logical management style would be management by directing. Management by directing is typically a simple extension of management by doing with specific procedures or directives taking the place of the individual. Like management by doing, management by directing is very formalized. In both of these styles of leadership, management controls the behavior of employees (Robbins, 1990) and the reason for change is directly linked to the person or persons in positions of authority, those who specifically feel the responsibility for being competitive. Management by results was the next popularized leadership style (Joiner, 1994). This change in approach to management by results was due directly to employees at the middle management level seeking to gain added responsibility. Adopted in many organizations, it failed to create the changes that were desired by employees because upper management would not relinquish the control that they felt was necessary for the organization to be successful. While passing responsibility in writing, the resources, people, money, material etc. were not made available for the employees to achieve the level of success expected. Management by results, while remaining the predominant management style today, continues to be less successful than it could be simply because of the failure to achieve a consensus on what the real objectives of the organization are (Robbins, 1990). In this hierarchy of management styles the operative process became one of recognizing the need to champion the desires of the customer and bring about fundamental organizational improvement. The need to move beyond customer satisfaction to something better became the impetus of change that has begun to shift management style to management by method (Joiner, 1994) or the systems approach (Robbins, 1990). This change was brought about by

the realization that while goals or objectives are important they are but one part of the process that will allow organizations to maintain themselves internally as well as being able to interact effectively with the external environment.

No matter what their management style, managers are always convinced that they are doing the right thing (Deming, 1986). Managers traditionally subscribe to the premise that all you have to do is work a little harder. This is contrary to what Deming said in so many of his presentations, "...you need to work smarter, not harder." Deming taught four profound changes to the Japanese following World War II. According to Delavigne & Robertson (1994), Deming's profound changes are the key component still missing from the American management culture today. The four profound changes that Dr. Deming taught the Japanese were (Delavigne & Robertson, 1994):

1. Every system has variation; hence, the information needed to create optimum systems is unknown and unknowable.
2. Using the scientific method we learn what is unknown, but knowable, faster.
3. By observing the operation of the system, built-in flaws can be detected and isolated.
4. Complexity can be reduced and entropy lowered by removing the built-in flaws. (p. 47)

Change is a necessity. "An effective organization is not a stable solution to achieve, but a developmental process to keep active" (Robbins, 1990, p. 382). The Japanese have demonstrated that change in America is a necessity and that change must be driven by an overwhelming need to improve the quality of our product (Deming, 1986). It seems that common sense would lead us to understand that improved product quality must be accompanied by improved quality in the service sector.

Quality Initiatives Used to Bring about Change

The American approach to quality had been one involving the experts. Engineers and statisticians determined the acceptable levels of variability and decided just what the customer was willing to accept. Foreign competition had taken a different approach by involving not only the company quality experts, but also the customer. This perspective meant that the customer had to be listened to, understood, and most of all satisfied. Three men emerged as the quality management experts in the early years of quality improvement in America; W. Edwards Deming (GAO, 1990), Joseph M. Juran (GAO, 1990), and Philip B. Crosby (GAO, 1990).

Dr. Deming suggested that organizations would consistently improve by creating a sense of pride, motivation, joy and a learning environment for all employees. Key principles such as leadership, profound knowledge, application of statistical process control, understanding variation, and adoption of the Shewhart cycle form the basis for Deming's philosophy (Walton, 1986). Central to his philosophy is the application of 14 management points that he felt were the basis for the transformation of American industry. The 14 points are summarized here from Deming's book Out of the Crisis (1986, pp. 23-24):

1. Create constancy of purpose for improvement of products and service.
2. Adopt the new philosophy; we are in a new economic age.
3. Cease reliance on mass inspection to achieve quality.
4. End the practice of awarding business on the basis of price alone. Move toward a single supplier to minimize cost.
5. Improve constantly and forever the system of production and service.

6. Institute training on the job.
7. Institute leadership.
8. Drive out fear so everyone will work effectively for the company.
9. Break down barriers between organizational components.
10. Eliminate slogans, exhortations, and targets for the workforce.
11. Eliminate management by numbers and quotas for the workforce.
12. Remove barriers that rob employees of pride of workmanship.
13. Institute a vigorous program of education and self-improvement.
14. Put everyone in the company to work to accomplish the transformation.

Deming's management philosophy was aired on ABC television in a 1980 documentary titled "If Japan Can, Why Can't We?" In his visits to companies Dr. Deming wanted to talk about company visions, quality improvement, and cultural change. He wanted top management involved. There was no mistaking the direction he wanted organizations to take and he wanted the leadership to lead the way.

Dr. Joseph Juran focused on the methodology to achieve and maintain quality leadership, to effectively define the roles of management in leading organizations, and to help top management achieve its vision. Juran's approach was based on three principles that he called the Quality Trilogy; quality planning, quality control, and quality improvement. In his book Juran on Planning for Quality (1988) Dr. Juran presents a 10-step problem solving team methodology for quality improvement. According to Juran, the 10 steps that upper management must be involved in are (GAO, 1990, p. 52):

1. Build awareness of opportunities to improve.

2. Set goals for improvement.
3. Organize to reach goals (establish a quality council, surface problems, select quality improvement projects, appoint teams, and designate facilitators).
4. Provide training.
5. Carry out projects to solve problems.
6. Report progress.
7. Give recognition.
8. Communicate results.
9. Keep score.
10. Maintain momentum by making improvement part of the regular system and processes of the company.

These ten steps demonstrate Juran's advocacy for control in the sense that processes remain in a predictable state. In support of his concept of the Quality Trilogy, Dr. Juran is a strong proponent of breakthrough. He defines breakthrough as, "...change, a dynamic, decisive movement to new, higher levels of performance..." (Juran, 1995, p.3). Breakthrough is a concept that supports positive change, while the idea of control is intended to prevent changes that would be detrimental to the organization or process. Juran sees breakthrough as the goal and the Quality Trilogy as the process needed to achieve that goal.

Philip B. Crosby, a leader in the field of quality control at the time Dr. Deming's quality and productivity ideas became popular in America, focused his principles of change on the behavior of people. He saw people as a key to solving quality problems and that by involving them they would feel empowered. This empowerment would lead to increased

individual commitment and eventually to a continuous improvement philosophy throughout the organization. This philosophical change would lead to improved processes as well as improved service to both external and internal customers. Like Deming and Juran, Crosby felt that quality could only be achieved if upper management were to take direct, deliberate action. Crosby's philosophy of change is founded on his five absolutes of quality management described in his book Quality is Free (1979, p.131). They are:

1. Quality means conformance, not elegance.
2. There is no such thing as a quality problem.
3. The only performance standard is zero defects.
4. The only performance measurement is the cost of quality. It is always cheaper to do the job right the first time.
5. There is no such thing as the economics of quality.

Like Deming, Crosby has a set of 14 steps (Crossbar, 1979) that involve the quality improvement process, but unlike Deming who considers his approach to be principle centered, Crosby suggests that his approach is one that is designed to change the organizational structure to improve communications and the operational processes. Crosby said "Quality is the result of a carefully constructed culture; it has to be the fabric of the organization--not part of the fabric but the actual fabric. It is not hard for a modern management team to produce quality if they are willing to learn how to change and implement" (GAO, 1990, pp. 55, 56).

Kaizen has become synonymous with Japan's competitive success and a part of the American movement toward quality improvement as well. Kaizen means improvement. In

fact, it means a continuous form of improvement that includes everyone in the implementing organization. More specifically it involves a philosophy that social life as well as organizational life should involve continuous improvement. Kaizen is a culture change that has been built on the concepts introduced in Japan by Deming and Juran as part of their reconstruction efforts. The basic Kaizen approach begins with the assumption that all organizations have problems (Imai, 1986). Starting with the idea that problems exist, Kaizen allows free and open communications in a culture where everyone can openly admit to the existence of problems without concern of reprisal. The true basis for the Kaizen strategy is the precept that management must satisfy the customer's needs if the organization is to not only remain profitable, but more fundamentally, to stay in business. The typical American approach to competition has price, quality, and service as driving forces. However, in Japan "competition" itself is often seen as the primary source of competition with companies often competing on improved ways to introduce new Kaizen programs. The theoretical basis for Kaizen is one of process-oriented management. The typical American approach is results oriented. While results are important in Kaizen, they are seen as a natural outcome of process improvement. Kaizen is fundamentally related to people and their efforts to improve processes. Kaizen is one of two differing approaches to progress. It represents the gradualist approach that is generally not dramatic or subtle and frequently goes unnoticed except for the outcome of continuous improvement. This varies from the more typical American approach, innovation, that involves rapid dramatic change (Imai, 1986).

It would seem, based on the traditional understanding of innovation as it compares to Kaizen, that innovations are typically related to fast growth economies that see dramatic

change as a daily occurrence. In his book Diffusion of Innovations (1995), Everett Rogers suggests that the process is more methodical than dramatic. Rogers defines an innovation as, "...an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 1990, p. 11). Diffusion is a process by which the innovation is communicated over time. The relative rapidity and effectiveness with which this diffusion process takes place are dependent on how the characteristics of the innovation are perceived by individuals. An innovation should be considered to be a change for the purposes of this study.

There are five basic characteristics of innovations that govern how fast the innovations are accepted (Rogers, 1995). They are: (1) relative advantage - the perceived improvement over the previous process; (2) compatibility - the perceived consistency with accepted values, previous experience, and customer needs; (3) complexity - the relative difficulty to understand and utilize the innovation; (4) trialability - the ease with which the innovation may be experimented (5) observability - how easy the results may be seen by others. The consequences of implementing the innovation are involved with changes that affect either the people, the organization, or both. Those supporting the innovation would like the consequences to be desirable, direct, and anticipated. Often there is at least one of these expectations that is not fulfilled simply because of the uncertainty involved with the outcome associated with the adoption of the innovation or innovative process.

Total Quality Management (TQM) is a "mass movement" (Shiba, Graham, & Walden, 1993, p. 307) that is difficult to define. It had become clear in the 1980's that in order for upper management to achieve the level of quality leadership that was desired, there

needed to be a coordinated methodology that brought together a diverse array of quality functions. Used in 1985 by the Naval Air Systems Command (Summers, 1997) to describe a Japanese style of quality improvement TQM is defined as follows:

> TQM is a management approach to long-term success through customer satisfaction. TQM is based on the participation of all members of an organization in improving processes, products, services, and the culture they work in. (Summers, 1997, p. 531)

The aim of TQM is to understand current processes and implement incremental improvements that will enable organizations to do what they already do, only do it better. It seemed obvious what TQM was about, but because it covered so many aspects of quality, one definition did not fit. TQM became better known by what was included in TQM than a given definition. TQM is at the heart of the problem solving process. It utilizes a variety of techniques that employ tools developed by men like Shewhart and Ishikawa (Hammer, 1996) to isolate problems that exist in fundamentally effective processes. The Summers definition of TQM, previously provided, will be used in this study. The TQM approach is one of change that brings about improvement in whatever environment it is employed. The methods used to implement this approach are found in the teachings of men like Juran, Deming and Crosby who each in their own way emphasize the importance of total employee participation in an organization. There are a variety of TQM implementation techniques. One such technique is Quality Policy Deployment (QPD). The purpose of QPD is to provide management with the procedures needed to implement TQM with the least resistance and greatest effectiveness. QPD is an implementation tool that utilizes a phased change process that is not disruptive to organizational capability (Sheridan, 1993). A key aspect of QPD is that, like TQM, it utilizes a cross-section of personnel in the planning process to improve

organizational communication and maximize coordination. Quality Function Deployment (QFD), like QPD, is a planning process that can be utilized in the implementation of TQM. The definition of TQM in part was, "...long term success through customer satisfaction..." (Summer, 1997, p. 531). This approach is supported by the QFD concept of going to the customer to determine the priority customer issues before the change is implemented. Typically QFD would be considered to be a proactive approach for organizations to integrate the application of quality improvement tools with the TQM concepts of people involvement and quality planning (Day, 1993).

If TQM was the operative method of bringing about change in the 1980's, reengineering has become the watchword of change in the 1990's (Mische, 1998). They both are customer based and recognize the importance of processes in the success of organizations. TQM and reengineering are fundamentally different. TQM and quality programs in general, work within the current framework of organizational processes to enhance incremental continuous improvement. Reengineering, on the other hand, seeks to manage breakthroughs (Juran, 1995) by replacing existing processes with completely new ones. A graphical comparison of process performance improvement generated by change brought about by TQM and reengineering is provided in Figure 2.1. This graphical comparison shows how they fit together over the life of a process.

TQM operates on the premises that the process is fundamentally sound and only needs minor enhancements to achieve needed improvement. It basically assumes that the world has not changed significantly since the process was implemented. Reengineering though suggests that processes may be flawed and dramatic change is needed.

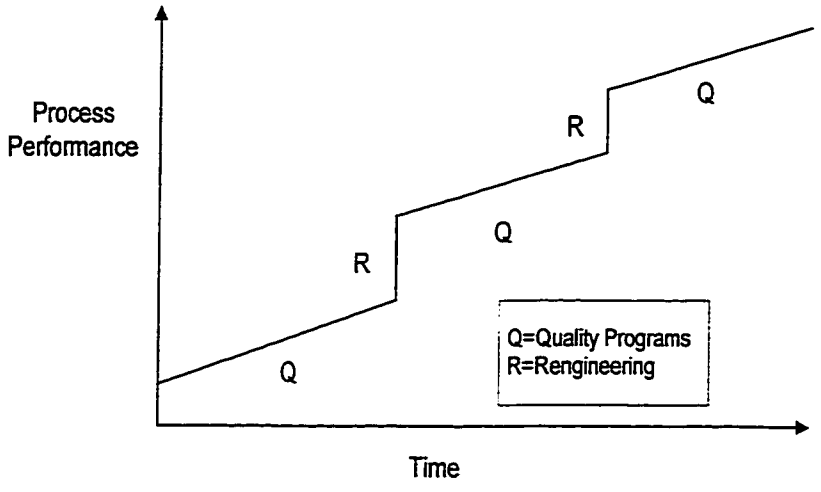

Figure 2.1: A comparison of quality programs and reengineering
Note: From Beyond Reengineering (p. 83), by M. H. Hammer, 1996, New York: Harper Collins Publishers, Inc.

Michael Hammer and James Champy (1993) in their book Reengineering the Corporation state that:

> Fundamentally, reengineering is about reversing the industrial revolution. Reengineering rejects the assumptions inherent in Adam Smith's industrial paradigm-the division of labor, economies of scale, hierarchical control, and all the other appurtenances of an early-stage developing economy. Reengineering is the search for new models of organizing work. Tradition counts for nothing. Reengineering is a new beginning. (p. 49)

When compared to the ideas formulated during the industrial revolution, reengineering makes some drastic changes that have tremendous impact on the people involved in fundamental operation of the organization. While these changes are listed here as part of reengineering, they too could be involved in organizational change brought about by use of other techniques (Deming, 1986). According to Hammer and Champy (1993, pp. 51-64) some of the major changes are:

1. Several jobs are combined into one.

2. Workers make decisions.
3. The steps in a process are performed in a natural order.
4. Processes have multiple versions.
5. Work is performed where it makes the most sense.
6. Checks and controls are reduced.
7. Reconciliation is minimized.
8. A case manager provides a single point of contact.
9. Hybrid centralized/decentralized operations are prevalent.

It is not intended that each of these nine changes would be expected to be present in a reengineered organization. Many are common, but several are contradictory (Hammer & Champy, 1993). Building this new design that incorporates, to some degree, completely changed processes requires a great deal of innovative thought, sound judgment and personal risk in order to achieve the ultimate goal of the step increase in process performance that is depicted in Figure 2.1. According to Michael Mist in Reengineering: Systems integration success (1998, p.29) "...more than two-thirds of the reengineering efforts are ending in failure." Like many of the failures involving quality initiatives in the past, organizations that have failed in their reengineering efforts have not functionally applied the reengineering methodology. Even though they called their plan a reengineering plan the change typically fell short. It did not include changes in measurement practices, personnel management or management style. They failed to consider the entire system when implementing the change process (reengineering).

The systems approach to managing change considers the overall perspective with respect to the organization. When properly applied the systems approach addresses both the planning and implementing functions of management during the change process (Cleland & King, 1975). The systems approach may be considered a scientific process or methodology that is frequently described relative to the elements that impact expected outcomes. Cleland and King (1975) suggest that this process involves the following:

1. Systematic examination and comparison of those alternative actions that are related to the accomplishment of desired objectives.
2. Comparison of alternatives on the basis of the resource cost and the benefit associated with each alternative.
3. Explicit consideration of uncertainty.

The systems approach may be confused with systems improvement. Systems improvement deals primarily with the proper functioning of the system or process as it exists. The systems approach to change is more appropriately applied when considering the methodology of system design and how to actually formulate and carry out the change (van Gigch, 1974). The systems approach requires an understanding of the system in relation to its parts as well as other systems that interface with it. These introspective and extrospective components of the systems approach force a look at the overall impact of process changes on the organizational components, as well as the external customers who expect to benefit from the change. The systems approach begins with the end in mind by addressing the impact of change on the entire system not merely the component parts. According to John van Gigch

(1974) there are four areas of key importance to the application of the systems approach to organizations. They are:

1. Defining the boundaries of the whole system and the environment.
2. Establishing the system's objectives.
3. Determining the program structure and the program-agents relationships.
4. Describing the system's management.

(p. 15)

These four management areas of concern are emphasized by a tabular comparison, Table 2.1, of the systems improvement and systems design (systems approach) methodologies of change. This table shows that utilization of the systems approach to change, with its emphasis on the entire system and the interactive nature of its components, is by far the more proactive approach to change. Table 2.1 also shows how the application of a concept that was developed in the 1970's, has formed the basis for many of the more recent quality initiatives used to bring about change. A key aspect of the 1974 systems approach was interdependence, a concept that over two decades later was popularized by Stephen Covey in his book Seven Habits of Highly Effective People (1989). Organizations are composed of interdependent parts. Programmed change must recognize the existence of this interdependency in order to insure that the components of an operationally effective organization continue to function effectively after the changes have been implemented (Tosi, Rizzo, & Carroll, 1986).

Diffusion of innovations (Rogers, 1995) is an old, yet new, methodology of understanding the change process and effectively implementing organizational change. It would be appropriate to assume that if a level of understanding change existed, then that

Table 2.1: A Comparison of Two Methodologies of Change:
Systems Improvement and Systems Design (Systems Approach)

	Systems Improvement	Systems Design
Condition of the system	Design is set	Design is in question
Concern	Structure and operation	Purpose and function
Paradigm	Analysis of systems and component subsystems (the analytical method)	Design of the whole system (the systems approach)
Thinking processes	Deduction and reduction	Induction and synthesis
Output	Improvement of the existing system	Optimization of the whole system
Method	Determination of causes of deviations between intended and actual operation (direct costs)	Determination of difference between actual design and optimum design (opportunity costs)
Emphasis	Explanation of past deviations	Prediction of future results
Outlook	Introspective: from system inward	Extrospective: from system outward
Planner's role	Follower: satisfies trends	Leader: influences trends

Note: From Applied General Systems Theory (p. 10), by J. P. van Gigch, 1974, New York: Harper & Row, Publishers.

understanding could be appropriately applied in instituting change in a way that creates the least concern for the organizations and their employees. Rogers (1995) defines diffusion as "...the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). The application here is that the innovation would be equated to a change and the social system would represent an organization.

Deciding whether or not to adopt an innovation or an innovative idea is a process that passes through five stages (Rogers, 1995). They are:

1. First knowledge of an innovation.
2. Forming an attitude toward the innovation.
3. Decision to adopt or reject.
4. Implementation of the new idea.
5. Confirmation of the decision. (Rogers, 1995, p. 161)

This process is one in which the organization deals with the uncertainty associated with the development or implementation of a new idea or concept, i.e. a change. An important component to this process is the time it takes for the innovation to be accepted by the individuals involved. This concept typically has not been applied to organizational change. According to Rogers (1995), there has been a great deal of research involving the understanding of individual differences in adopting innovations, but very little done to understand how the differences in the innovations affect the rate of adopting the innovations. The rate of adoption of an innovation is the speed with which it is either accepted by the employees of an organization, or by the customers in the case of a newly released product. Rogers (1995) suggests that there are several key independent variables that directly impact the adoption rate of any innovation. These independent variables are directly related to the perceived attributes of the innovation, the type of innovation decision, the communication channels available, the nature of the social system, and the extent to which the change agent has promoted the innovation (Rogers, 1995). These specific independent variables provide a subjective basis for the diffusion process and determine whether or not an innovation is accepted.

A Quality Intervention for Change

The quality intervention considered in this study is an application of the systems approach developed by Dr. Robert Gelina. Dr. Gelina has used this application extensively in dealing with client organizations since 1991 when he founded the Center of Continuous Quality Improvement (CCQI). CCQI utilizes a Deming based approach that focuses extensively on the reduction of variability in organizational processes. The CCQI intervention is used in both production and service related organizations to guide these organizations through a change process. This approach is reflected in the following CCQI mission statement (Gelina, 1991).

> "The Center for Continuous Quality Improvement is dedicated to helping organizations achieve improved working environments, greater profitability and customer delight through the implementation of the Quality Improvement Process."

The process begins with a management visit that is intended to establish a relationship between CCQI and the potential client organization for the purpose of gaining an opportunity to make a presentation to the top organization managers. During the management visit, CCQI associates accomplish the following:

1. Meet key managers and learn about their organizational functions.
2. Tour the facility to generally learn the business, understand terminology, identify the sense of urgency, gain a feeling for the environment and to establish rapport.
3. Conduct a presentation that introduces the CCQI quality improvement process and provides an overview of the implementation process.
4. Answer any concerns and questions about the change process and set the agenda for the next step that is the management presentation.

Subsequent to the management visit CCQI associates return to make a presentation to top management. The intent of this presentation is to educate the organization's leadership so that they will be able to make an informed decision on the implementation of continuous quality improvement (CQI). The key components of this presentation are: the urgency for change, the role of paradigms in the organization, the CQI philosophy, and the CCQI implementation strategy.

Once top management has accepted the CCQI approach, the intervention process begins. This education process starts with a critical mass of employees utilizing the CCQI 34 hour CQI course in classes of about 15 to 20 people each meeting once a week for 2 hours. This critical mass is represented by enough employees to effectively function to solve problems as members of cross-functional teams using quality concepts found in Dr. Gelina's book Continuous Quality Improvement (1997). The organization's leaders are also included in this early education process. Once a critical mass of employees is trained, the steering committee composed of organizational leaders (president, CEO, CFO, COO, etc.) is formed and educated. The steering committee then is able to make company-wide cross-functional team assignments composed of employees who have the understanding and capability to deal with significant organizational issues using the methods taught by CCQI. This approach allows the organization to begin to use the concepts taught by CCQI while the remainder of the employees are educated using the 34 hour CCQI course.

This intervention process typically represents a long-term relationship between the organization and CCQI that consistently establishes strong rapport. The CCQI approach not only provides the education, but facilitation for the operating teams, problem solving teams

and steering committee alike. CCQI also provides ongoing support and guidance where needed.

Fear and Organizational Change

Organizational change, as previously discussed, is a necessary element for success. Understanding fear and its relationship to organizational change are also key components to achieving this success. As noted earlier, anxiety and stress are more frequently used terms than fear in association with organizational change. According to Mark Leary in his book Understanding Social Anxiety (1983) there should be no distinction between fear and anxiety. Leary (1983) defines anxiety (fear) as "...a cognitive affective syndrome that is characterized by physiological arousal (indicative of sympathetic nervous system arousal) and apprehension or dread regarding an impending, potentially negative outcome that the person believes he or she is unable to avert" (p. 15). A logical conclusion that would be derived from these definitions is that any time change occurs fear might easily be construed to exist and some form of human resistance would be present (Kotter & Schlesinger, 1979).

This resistance typically manifests itself in the form "worst-case thinking" (Ryan & Oestreich, 1991). Even though the modifications are moderately small and have had proven positive implications in other environments, the perceived "worst-case" outcomes accumulate as an emotional impact to those who are affected by the change (Ryan & Oestreich, 1991). Irving Janis and Howard Leventhal in Human Reaction to Stress (1968) consider this human reaction as a form of "objective anxiety" referred to as reflective fear. This is directly related to the influence it has on the person's "...conscious anticipation of personal vulnerability" (Janis & Leventhal, 1968, p. 1047).

People have experienced losses during organizational change and knowledge of this kind of loss has caused stress, anxiety and fear. In The Challenge of Change in Organizations (1995) Nancy Barger and Linda Kirby group these kinds of losses into what they call "predictable losses". Predictable losses are: loss of familiar territory and people, loss of ownership, loss of structure and clarity, loss of an anticipated future, loss of meaning and direction, loss of control and predictability, loss of power and influence, loss of friends and colleagues, loss of networks and resources, loss of knowledge and expertise in a new situation, loss of security and confidence. A major problem in understanding that anxiety and fear can be a significant outcome of these losses is that organizational leaders move directly from loss to opportunity (Barger & Kirby, 1995) with little or no consideration of the impact on employees.

An organization is a "social entity" (Robbins, 1990) that has been established to achieve a purpose conceived to meet a human need or set of human needs. As a social entity, the organization is composed of people who interact with one another. The foundation and power needed for this interaction to be effective is based on the ability of each individual and group of individuals to communicate with each other and with the organization. Central to this ability to communicate is an organizational climate that is devoid of fear. A key foundational precept of achieving this "fearless" organization is the establishment of an environment that openly supports inputs from all levels. While some organizations are founded on these principles, the majority of organizations get to this point through a series of changes that are predominantly related to structure and leadership (Joiner, 1994). Nonaka and Takeuchi (1995) described the Japanese approach to innovation as follows:

> How do Japanese companies bring about continuous innovation? One way is to look outside and into the future, anticipating changes in the market, technology, competition, or product. We have argued thus far that living in a world of uncertainty worked in favor of Japanese companies, since they were constantly forced to make their existing advantages obsolete. In fact, this trait -- the willingness to abandon what has long been successful -- is found in all successful companies, not only those in Japan. To these companies, change is an everyday event and a positive force. (p.5)

It is apparent then that change is a very necessary component in the process needed to achieve and maintain organizational success and if fear is conceptually a part of change then it is appropriate to understand more about its impact.

Summary

The literature review provided an historical overview of organizational change, the reasons for change and the major theories or techniques used to bring about change. Highlights of previous research addressing organizational change and the relationship between stress and fear were presented to establish an appropriate link between the two for purposes of data collection. The intervention considered to be the source of change in this study was described in detail. A view of the organization as a social entity was presented linking fear to organizational change.

The evolution of change has been a part of this country since its inception. There has always been a need to do it differently and in a way that seemed to be better. The pioneers were the first to see the benefit of change. They were followed a century or so later by men like Taylor, Ganatt and Gilbreth who ushered in scientific management. Einstein, Lewis and Shewhart were key figures in bringing new knowledge to the twentieth century. The last two decades of the twentieth century saw a growing number of concepts to bring about change. Deming, Juran, and Crosby were proponents of quality improvement who lead the charge for

change. Kaizen, TQM and reengineering were three of the techniques that have been involved in these last two decades of change.

While each of these different approaches were directed to change for the sake of organizational improvement, previous studies suggest that they brought fear, anxiety and stress to the individual in the workplace. These studies countered Deming's principle that fear could be driven from the workplace if organizational change was appropriately and consistently brought about as a means to improve quality of production and service processes. The literature revealed little with respect to measuring what Deming called "fear". However, Dr. Spielberger operationally defined occupational stress in the same way that Deming defined fear making it possible to utilize literature concerning occupational stress in interpreting results, making conclusions, and establishing implications derived from the study. It is important to remember that change is a necessary component in organizational improvement. Since fear is a personal component present in change, it is quite appropriate to better understand relationships involving fear and organizational change instituted for quality program implementation.

CHAPTER 3. METHODS USED

This chapter identifies the methods and procedures utilized in meeting the objectives of this study. Survey techniques (Isaac and Michael, 1995) were used which provided a measurement of the level of fear/anxiety within the studied organizations as well as measures of selected characteristics of the individuals and organizations involved in the study. The following topics are addressed in this chapter: research design, population and sample determination, instrument development, data collection and data analysis.

Research Design

Correlational research was then used to investigate any apparent relationships between fear/anxiety and the independent variables. The independent variables (organizational and individual) were: organization size (number of employees), employee demographics [years employed by the organization (tenure), age, sex, years of education and job type] and the level of quality program implementation at the time of the study. Since only organizations that had been or were currently involved in the quality improvement program developed by CCQI were selected for the treatment group, a quality implementation assessment instrument completed by CCQI associates, knowledgeable about each organization, was used. Using only organizations that had been involved with the CCQI education process and using CCQI associates to assess the level of quality implementation helped assure that the program content and delivery techniques were consistent across the organizations participating in the study. A very limited control group, three small organizations, none of which had participated in the dedicated CCQI education process, was used for comparison. This overall analysis was conducted with emphasis on developing an

understanding of employee fear and the degree with which it was related to the level of quality program implementation.

Variables considered in the study

The dependent and independent variables considered in this study are shown in Table 3.1. The delivery technique was considered to be a constant in the study because of the very detailed and structured CCQI associate and quality advisor education process, exclusive use of the CCQI training manual, and use of highly structured delivery procedures. A control group of similar organizations was chosen from a list of organizations that had not been associated with CCQI. The control group surveys were administered and scored in the same manner as the field study surveys. The independent variables considered in this study were chosen because of the key relationship that they have had to the study of fear/anxiety in other environments.

Age and sex were found to be significantly related to anxiety in applications that utilize the Beck Anxiety Inventory (1988). Thomas Dowd's (1993) review of the Beck

Table 3.1. Dependent and independent variables

Dependent	**Independent**
Fear/Anxiety	Organizational variables Organization size Degree of quality implementation Individual variables Sex of the respondent Years employed by the organization Age of respondent Years of education Job type

Anxiety Inventory in the Supplement to the 12th Mental Measurements Yearbook reported that women were more anxious than men and that younger individuals were more anxious than older people. A 1980 article by Haynes and Feinleib suggested that gender was frequently found to account for differences in the incidence of, as well as differences in occupational sources of, stress such as job changes and promotion. Age was also found to be significantly correlated with eight of eighteen scales on the California Psychological Inventory (Bedeian & Feild, 1988) in a study that involved 1,138 men and women. Four of the eight scales reported on included the fear/anxiety related components: sense of well-being and self control. Parasuraman and Alutto (1984) reported that trait anxiety was a strong contributor to felt stress. They also reported that age had a negative effect on felt stress which they contributed to the fact that more mature individuals had a more well developed stress tolerance than younger persons who have had fewer experiential years to develop coping mechanisms. Richard S. Lazarus in the Handbook on Job Stress (1991), while not suggesting the exact impact, linked daily stress patterns vary to age, socioeconomic variables, type of job and personality". Since age has been shown in past studies to play a key role in determining the level of fear/anxiety, it could therefore be argued that years of employment would be equally applicable because of an expected high correlation between age and years of employment.

Turnage and Spielberger (1991) utilized factor analysis techniques to identify job pressure and lack of organizational support as two job stress factors in their study of managers, professionals and clerical workers in a large manufacturing firm. Using the Job Stress Survey (JSS), Turnage and Spielberger (1991) were able to establish a differential

relationship between job pressure and lack of organizational support with age, sex, occupational level, locus of control, job tenure and job satisfaction. Studies conducted by Spielberger and Reheiser (1994) supported their earlier results and suggested a more pronounced impact on sex differences when considering job level in a broader sample of corporate, military and university personnel.

Ron Zemke (1991), senior editor for Training magazine, reported the results of a survey conducted by Northwestern National Insurance Company in his 1991 article Workplace Stress Revisited. This survey showed that of the 600 full-time employee respondents 33% had considered quitting because of "burn out", 50% felt that stress levels were extremely high, 33% said that job stress was the single greatest stress in their lives, 70% thought that job stress lowered their productivity and 82% felt that individuals suffering from "burn out" should be compensated in the form of disability pay. Zemke (1991) also reported that as organization size increased up to 500 employees, the percentage of managers that appeared to be stressed increased to as high as 50%. The percentage of "stressed" managers then remained relatively constant at 50% or 51% as organization size increased to 2500 employees.

Population and Sampling

The population consisted of all organizations that have completed or were currently involved in continuous quality improvement training provided by the Center for Continuous Quality Improvement (CCQI) of Ames, Iowa. An analysis was conducted to measure certain demographics of the organizations served by CCQI. This analysis was used as the basis for a balanced population, as much as practicable, of organization size.

The design was simplified based on the availability of organizations. There were 59 organizations/organizational components in the initial population of organizations. Two of these were not for profit and five had greater than five hundred employees. The number of organizations/organizational components was reduced from 59 to 44 to eliminate the very small organizations, those with fewer than 10 employees, and to consolidate multiple organizational components that were begun under a single contractual agreement. Since there were so few "not for profit" organizations, the Type of Organization category was eliminated as an independent variable. The number of categories of organizations based on size was again reduced from three (small; 1-49 employees, medium; 50-499, and large; more than 499) to two, small (10-99), 19 companies and large (more than 100), 25 companies. This definition of small and large organizations was later modified when fewer of the small organizations granted permission to conduct the study. The final organizational components were: small (10-150), eleven companies and large (more than 150), eleven companies (Appendix G). A group of twenty-one organizations, 13 small and 8 large, that had not been involved in training provided by CCQI were invited to participate in the field study as a control group. Of the 21, three chose to participate. The CCQI client organizations received a letter (Appendix H) of introduction from CCQI's Director inviting them to participate in the study. These companies and the prospective control companies received a letter (Appendix I) from the investigator explaining the field study, and requesting their participation.

The sample size for each organization was chosen to minimize the margin for error, to maximize the level of confidence (95%), and to insure an adequate frequency of occurrence of the variables being considered. In order to meet these criteria the target sample size was

chosen using Table 6.1 in Organizational Surveys (Kraut, 1996, p. 158). This approach provided for the proper weighting based on organization size and supported the need to assure anonymity.

Employees from each of the organizations were chosen to achieve maximum organizational participation possible (random selection using a random number table where possible). Each person was asked to complete the Job Stress Survey (JSS) to assess the level of fear/anxiety that each individual personally experienced. Prior to the distribution of the JSS, employees were provided information describing the purpose of the survey and inviting them to be honest in their answers without concern for reprisal.

Instrument Used for Measuring Fear/Anxiety

The Job Stress Survey (JSS) (Spielberger & Vagg, 1999), (Appendix A) modified for computer scoring (Appendix C), was used to assess the level of fear/anxiety in organizations. The JSS was chosen as the instrument to assess the level of fear/anxiety in organizations because of its development methodology and its demonstrated success in similar studies.

The JSS was "...designed to assess generic sources of occupational stress encountered by men and women employed in a wide variety of work settings and to address aspects of work stress that have not been evaluated by existing measures" (Vagg and Spielberger, 1998, p. 298). The JSS had as its basis two earlier surveys titled the Police Stress Survey (PSS) and the Teacher Stress Survey (TSS) respectively. The PSS had been developed to assess the level of specific stressors in law enforcement personnel (Spielberger, Grier, & Pate, 1980; Spielberger, Westberry, Grier, & Greenfield, 1981) and the TSS had been constructed to evaluate occupational stress in high school teachers (Grier, 1982). Each of these instruments

was developed to assess stress in a particular job category. The evolution of the development methodology led to the more generic JSS which was more appropriately used for stress measurement in a variety of occupations. The overall and component reliability of the JSS was established as part of the instrument development process documented in the Professional Manual for the Job Stress Survey: Research Edition (Spielberger & Vagg, 1999).

> Normative data for the JSS were obtained by administering the inventory to heterogeneous samples of 2,173 adults (1,218 males, 955 females) employed in business and industry, university, and military settings. The normative samples included 393 managerial, professional and clerical employees (279 males, 114 females) working at the corporate headquarters of two large industrial companies, 1398 administrators, faculty and staff associated with a large state university (581 males, 817 females) located in an urban setting, and 382 senior military personnel (358 males, 24 females) who were participating in a program for high-ranking officers considered to be qualified for possible flag rank. (p. 21)

The alpha coefficients for the corporate and university groups were 0.80 or higher, (Spielberger & Vagg, 1999) suggesting strong evidence of internal consistency. The military group alpha coefficients were slightly lower, but higher than 0.75 (Spielberger & Vagg, 1999) being suggestive of a slightly lower internal consistency. These lower alpha coefficients were attributed to the more homogenous military group (Spielberger & Vagg, 1999) as compared to the university and corporate populations.

Further refinement of the JSS, utilizing principle-components factor analysis with oblique (promax) rotations (Spielberger & Vagg, 1999), identified two specific subscales associated with occupational stress. These subscales, job pressure and lack of organizational support (Spielberger, 1994), were particularly relevant to the level of quality implementation and how it is related to fear/anxiety in organizations. The JSS provided a measure of fear/anxiety (JSS Stress Index) as well as the amount of stress from job pressures and lack of

organizational support. Face and criterion based validity are documented in the Professional Manual for the Job Stress Survey; Research Edition (Spielberger & Vagg, 1999).

The data used in this research were confirmed to be adequate for factor analysis using the Kaiser-Meyer-Oklin measure of sampling adequacy (MSA) (Kaiser, 1970). Kaiser (1970) suggested that good factor-analytic data would result in MSA's of at least 0.8 and MSA's greater than 0.9 would reflect excellent data. Kaiser (Kaiser & Rice, 1974) designated the following levels for the evaluation of sampling adequacy (MSA): >0.9 (marvelous), >0.8 (meritorious), >0.7 (middling), >0.6 (mediocre), >0.5 (miserable), <0.5 (unacceptable).

Determining the Level of Quality Program Implementation

Understanding the extent to which continuous quality improvement effects the level of fear/anxiety in an organization depends on both the measurement of fear/anxiety and an assessment of the degree to which continuous quality improvement has been implemented in the organization. For example, organizations without a quality improvement program may experience a higher level of employee fear than organizations that have implemented and are using a quality improvement program that has been accepted by a majority of the employees.

The level of quality program implementation was assessed by the CCQI associates who were familiar with the Continuous Quality Improvement (CQI) process, its application, and the companies being evaluated. The associates used an instrument, the Organization Quality Program Implementation Assessment (OQPIA) (Appendix E), that was developed utilizing the 1999 Malcolm Baldrige National Quality Award criteria as a guideline. Adapted from Malcolm Baldrige National Quality Award (MBNQA), the OQPIA utilized those MBNQA components that were directly related to the training provided by CCQI. The

MBNQA was chosen as the basis for the OQPIA because of its basic foundation in quality measurement and evaluation. Introduced in 1988 (Bemowski, 1996), the MBNQA was developed to recognize companies in the United States for performance excellence in leadership, strategic planning, customer and market focus, information and analysis, human resource focus, process management and business results. As stated in the MBNQA 1999 Criteria for Performance Excellence:

> The Malcolm Baldrige National Quality Award is an annual award to recognize U. S. companies for performance excellence.
>
> The Award Promotes:
>
> - awareness of performance excellence as an increasingly important element in competitiveness; and
> - information sharing of successful performance strategies and the benefits derived from using these strategies. (p. 49)

The award was viewed as not only a means of recognition, but also as a method of sharing the successes achieved by the winners with other manufacturing companies, service companies and small businesses. Because the MBNQA was designed to recognize organizations embracing the quality paradigm, it was considered to be the logical source of information for the development of a tool for use in assessing the level of implementation of continuous quality improvement in this study.

Since the companies being evaluated were not competing for the Baldrige Award, the instrument was developed to assess only those areas that the respective companies have received or are receiving training. The associates completing the assessments are employed

by CCQI and were directly involved in the pre-training organizational assessment conducted by CCQI, as well as, the delivery of the detailed training materials associated with continuous quality improvement implementation for each company. The training addressed was specifically provided by the Center for Continuous Quality Improvement. The five CCQI associates concurred in the operational effectiveness of the OQPIA before it was used as a general measurement tool for assessing the level of quality program implementation. A key point that must be understood is that each of the organizations may be at various levels of quality program implementation that could result in a very wide range of level of quality program implementation scores. For example, the organizations would be typically in one of the following four stages of training:

1. Active-employee training is either in progress or complete and management is utilizing CCQI quality programs throughout the organization.
2. Ongoing-training is either in progress or complete and management has begun to utilize CCQI quality programs.
3. Some-training is either in progress or complete and management has chosen to utilize CCQI quality programs to a very limited extent.
4. Inactive-training has either been completed or was terminated and management is not utilizing any CCQI quality program.

While there was no effort to place the assessed organizations in one of the above categories, it would be appropriate to expect that organizations involved in categories 1-3 would achieve a higher quality assessment score.

Data Collection

Data were collected at each of the selected organizations utilizing the same procedure to ensure that uncontrolled variables incorporated into the data collection process were held to a minimum. Organizational survey procedures for data collection (Kraut, 1996) were followed to insure that a representative sample from each of the independent variables was obtained. A purpose statement and instrument instructions were prepared and used each time the instrument was administered. The employees participating in this study were requested to carefully read the survey instructions (Appendix C) that explained how their anonymity and confidentiality was protected. There were no identifying codes on the surveys that could be used to trace information back to an individual. The number selected from each category was based on standard statistical techniques (Kraut, 1996) that considered population size and number needed to be representative. Those chosen to participate were requested to complete the survey and return it to the researcher or his designated representative.

Data Analysis

The basic descriptive data were analyzed with tools available in Microsoft Excel and all detailed statistical analyses were conducted using the Statistical Analysis System (SAS). The SAS program used for the majority of the analyses is provided in Appendix J.

Cronbach alpha calculations were evaluated to assess the reliability of the instrument using the data obtained from the JSS. Principle component factor analysis followed by a promax (oblique) rotation was used to replicate the development of the original JSS to establish construct validity for the data used for this study.

Descriptive and inferential statistics were utilized in the initial analysis of the collected data including frequency plots and t-tests to assess the difference in means. The Scheffe and Bonferroni methods of multiple comparison were used to assess the differing effects of each of the independent categorical variables on the level of fear within each organization and correlational analysis was used to assess the effect of the independent variables that were continuous. The General Linear Model (GLM) in the Statistical Analysis System (SAS) was used to assess the variance associated with each of the independent variables utilizing an analysis of covariance procedure (Neter, Wasserman, & Kutner, 1990). GLM was also used to determine the best subset of independent variables to describe the level of fear. This same procedure was used to assess each of the hypotheses discussed in Chapter I of this study. Since the data were collected by organization a statistical analysis was conducted to confirm that there was no significant contribution to the level of fear from one organization, or a cluster of organizations.

The data collected from the participating control group organizations allowed for minimal analysis of differences. Since so few organizations agreed to participate and they were all of one organizational size category (three small organizations), no meaningful statistical analysis could be conducted.

The observational nature of the study, combined with CCQI being the only educational organization that provided training, required that any inferences made must be conditional in nature. These conditional inferences formed the basis for the recommendations for further study.

CHAPTER 4. RESULTS AND FINDINGS

This chapter reports the results and findings gained through analysis of data obtained by administering the Job Stress Survey (JSS) in selected organizations. The chapter is organized into five sections:

1. General characteristics of the organizations selected for this study and the JSS respondents,
2. Description of instrument reliability and construct validity,
3. Description of the JSS statistical results,
4. Findings concerning each hypothesis,
5. Summary.

General Characteristics of the Participating Organizations and Individual Respondents

Survey data were collected from respondents at site locations specified by the participating organizations. Two of the independent variables (organization size and level of quality implementation) were related at the organizational level and the remaining five independent variables (sex, years of employment at the specific organization, years of respondent education, job type and age) were directly related to the individual respondents. A discussion of the organizational and individual characteristics follows.

Organizational characteristics

Twenty-five organizations participated in this study, twenty-two [eleven large (>150 employees, mean = 511.3) and eleven small (</= 150 employees, mean = 70)] organizations had received the CCQI continuous quality improvement education and three (all small, mean = 60.3) had not. All but one of the organizations studied were located in Iowa. The twenty-two organizations participating in the CCQI quality education process were broadly

categorized as manufacturing (8 or 36%), agricultural (7 or 32%) and service (7 or 32%). Two of the service organizations were not-for-profit organizations, a county hospital and a city government. The three organizations that had not been involved with CCQI or with any other quality based intervention were categorized as manufacturing (2 or 67%) and service (1 or 33%). A summary of the overall scores on the Organization Quality Program Implementation Assessment (OQPIA), along with the number of employees and employee sample size for each organization, is provided in Table 4.1, Table 4.2 and Table 4.3.

Eleven organizations with 150 or fewer employees and categorized as "small" for purposes of this study (Table 4.1) with representation from each of the three broad functional categories (manufacturing, service, agriculture) constituted one group in this study. The mean small organization size was 70.0 employees with a mean sample size of 49.8 employees. The small organizations had OQPIA scores ranging from 95 to 458 with a mean score of 293.9.

Eleven organizations with greater than 150 employees and categorized as "large" for purposes of this study (Table 4.2) with representation from each of the three broad functional categories (manufacturing, service, agriculture) constituted the second group in this study. The mean large organization size was 511.3 employees with a mean sample size of 113.4 employees. The large organizations had OQPIA scores ranging from 88 to 445 with a mean score of 286.5.

When comparing the small and large organizations, the small organizations have a slightly higher OQPIA score, 305.1 compared to 300.7, but the range of organizational OQPIA scores is quite similar, 363 compared to 357. These similarities exist with vastly

Table 4.1: Summary of Organization Size, Organization Sample Size and Quality Assessment Results for Small Organizations Involved in the CCQI Education Process

ORGANIZATION	EMPLOYEES	SAMPLE	OQPIA
1	27	26	297
2	28	17	318
3	45	36	386
4	56	47	370
5	68	40	458
6	70	22	95
7	72	49	244
8	72	63	260
9	82	46	320
10	100	85	230
11	150	117	255
Total Small	770	548	
Mean/SD	**70/34.5**	**49.8/29.4**	**293.9/95.5**
Range	**123**	**100**	**363**

different mean organization sizes, 70 compared to 511.3 as well as overall participation, 71.2% for the small organizations and 22.2% for the large organizations. The difference in participation was the direct result of personnel availability on the days chosen for the survey and the survey methodology. As mentioned earlier, participants were randomly selected from staff rosters for some of the large organizations and the selected individuals may not have been available on the survey day or those surveyed may have been the only staff members present on that day.

When considering the studied organizations (N=22) that are or have been involved in the CCQI education process, there is a mean employee population of 290.6 with a standard deviation of 456.1. There is a mean sample size of 81.6 with a standard deviation of 50.8,

Table 4.2: Summary of Organization Size, Organization Sample Size and Quality Assessment Results for Large Organizations Involved in the CCQI Education Process

ORGANIZATION	EMPLOYEES	SAMPLE	OQPIA
12	160	89	305
13	190	104	176
14	190	56	380
15	216	76	245
16	223	84	88
17	250	173	370
18	300	187	445
19	331	68	230
20	549	84	375
21	1265	167	395
22	1950	160	142
Total Large	5624	1248	
Mean/SD	**511.3/573.1**	**113.4/48.1**	**286.5/117.6**
Range	**1790**	**131**	**357**

and a mean OQPIA score of 290.2 with an associated standard deviation of 104.6.

Three organizations (Table 4.3) from the service and manufacturing categories formed a limited control group. The mean employee population of 60.3 was much closer to the small organization mean (70) previously described than the mean for the large organizations. Even though all of the control group organizations were considered to be small, the small number of organizations and their small overall employee population resulted in a mean sample size and mean standard deviation that was considerably different than the mean and standard deviation for the small organizations comprising the CCQI client organizations.

Table 4.3: Summary of Organization Size, Organization Sample Size and Quality Assessment Results for Small Control Organizations that have not been involved in the CCQI Education Process

ORGANIZATION	EMPLOYEES	SAMPLE	OQPIA
26	15	15	Missing Value
27	20	18	Missing Value
28	146	29	Missing Value
Total	181	62	
Mean/SD	**60.3/74.2**	**20.7/7.4**	
Range	**131**	**14**	

Characteristics of individual JSS respondents

There were 1858 individual participants in this research effort, 1796 from organizations that had or were participating in CCQI education programs and 62 from non-participating organizations. Of those participating 30.5% were from small organizations and 69.5% from large organizations.

It was intended at the onset of this study to make statistical comparisons between CCQI client organizations and organizations that had not participated in the CCQI education process (control group). Because of the limited participation of the control group and the large demographic imbalance associated with the two groups, the statistical analysis was not possible. Tables 4.4, 4.5, and 4.6 present the results obtained from a limited comparison of demographic data and make appropriate comparisons of the two groups based on the data that was available.

Demographics relative to each participant were: sex, years of employment with the subject organization, age, years of education and job type. Job type was divided into five

classifications: manager, supervisor, professional, clerical and worker. Table 4.4 compares those respondents participating in the CCQI education process to those who have not by sex. Table 4.5 and Table 4.6 provide a summary of the individual participant demographic information for all participants. These tables make appropriate comparisons between the participants employed by the twenty-two organizations that have participated in the CCQI education process , as well as those organizations that had not participated in the CCQI education programs. Demographic information by organization is provided in Appendix G.

Table 4.4 shows the male dominance of the employee sample in the major categories of organizations participating, 61.1% compared to 34.8% with 4.1% of the respondents choosing not to include an indication of their sex on the response form.

Table 4.5 provides a comparison of the frequency of respondents by job type for both CCQI clients and organizations not associated with CCQI. Male employees dominated the manager/supervisor job types with 76.6% of those positions reportedly being filled by males.

Table 4.4: Frequency and percentage distribution for sex of JSS participants

Demographic Variable	**CCQI Clients**	**Not Associated with CCQI**
Sex		
Male	1097 (61.1%)	44 (71.0%)
Female	626 (34.8%)	13 (20.9%)
Missing Value	73 (4.1%)	5 (8.1%)
Total	1796 (100%)	62 (100%)

Of the individuals who reported being in clerical positions, 97.6% were female. Female employees filled 47.9% of the professional positions in CCQI client organizations as compared to 29.4% in the non-client organizations. When considering females separately, 26.8% of the CCQI client organizations had females in professional positions, as compared to 38.5% of the non-client organizations, presenting the exact opposite impression. This comparison emphasizes the difficulty in making statistical comparisons between groups with very diverse demographics. Many of the individuals completing the JSS filled organizational positions that had multiple job titles. Participants were requested to respond by selecting the choice that would most appropriately describe the job that involved the majority of their workday.

Table 4.5: Frequency distribution for job type and sex of the organizations that have and have not participated in the CCQI education process

Demographic Variable	**Frequency male (female) CCQI Clients**	**Frequency male (female) Other Organizations**
Job Type		
Manager	159 (58)	9 (0)
Supervisor	138 (38)	7 (1)
Professional	183 (168)	12 (5)
Clerical	9 (200)	0 (4)
Worker	608 (162)	16 (3)
Total	1097 (626)	44 (13)

Table 4.6 compares the years of employment, years of education and age for male and female respondents employed by organizations that have utilized the CCQI education process to those who have not. The employees of organizations that have not worked with CCQI were typically more educated, younger and had been employed by their respective organizations for a shorter period of time. The data indicated that male employees had been employed longer while the female employees had more education. Respondents of both

Table 4.6: Mean and standard deviation for years of employment, years of education, age and sex

Demographic Variable	**CCQI Client Organizations Mean (SD)**	**Other Organizations Mean (SD)**
Yrs. Employment		
Male	8.88 (8.96)	6.25 (7.96)
Female	7.10 (7.22)	6.19 (7.88)
Total	8.21 (8.43)	6.43 (7.99)
Yrs. Education		
Male	13.39 (1.88)	13.93 (1.70)
Female	13.78 (1.67)	14.04 (1.50)
Total	13.4 (1.81)	14.04 (1.66)
Age		
Male	40.1 (11.45)	34.76 (9.64)
Female	39.45 (11.13)	35.33 (12.29)
Total	39.92 (11.30)	35.47 (7.99)

sexes associated with the CCQI client organizations tended to be older and had been employed longer. The remainder of the study will be directed to the analysis of data obtained from the CCQI client organizations because of the inability to make appropriate comparisons between the CCQI client group and the control group for the reasons previously mentioned.

Estimate of Instrument Reliability, Construct Validity and Sampling Adequacy

This section provides the results of the data analysis intended to replicate the development of the original JSS (Spielberger & Vagg, 1999) thus confirming it to be an appropriate instrument for use in conducting this research. This study involved 1858 adult participants, 1796 of whom (1097 males, 626 females, 73 unknown) were employed by one of twenty-two organizations that had or were participating in CCQI quality education program. The twenty-two organizations were involved in one of three major industries: eight manufacturing, seven service, and seven agricultural. Instrument reliability, construct validity, and sampling adequacy will be discussed.

Instrument reliability

The JSS Scale, Job Pressures Subscale and Lack of Support Subscale were calculated (Spielberger & Vagg, 1999) from the responses to the 60 JSS questions. Each of the scales and subscales were then evaluated using the Statistical Analysis System (SAS) (Appendix J) to assess the reliability of the JSS as it applied to this study. The JSS stress index summary listed in Table 4.7 provides the alpha coefficients for each of the JSS scales. All of the alpha coefficients were greater than 0.8 suggesting a high degree of internal consistency. As reported in Chapter 3, the alpha coefficients achieved during the development of the JSS (Spielberger & Vagg, 1999) were also greater than 0.8, with the exception of a group of

Table 4.7: Means, Standard Deviations and Alpha Coefficients for the JSS Stress Index, Severity and Frequency Scales for all CCQI Client Organizations

INDEX	JSS SCALE Based on 30 Items	SEVERITY	FREQUENCY
Stress	**JS-X**	**JS-S**	**JS-F**
Mean	20.5856	4.6686	3.1480
SD	11.219	1.2095	1.6203
N	1792	1792	1792
Alpha	0.871165	0.914764	0.901886

senior military officers where the alpha coefficients were 0.75 or greater.

The summary of the JSS Job Pressure Subscale indices provided in Table 4.8 provides the alpha coefficients for each of the JP scales. The alpha coefficients for the JP scales were also greater than 0.8 again suggesting a high degree of internal consistency.

The summary of the JSS Lack of Support Subscale indices provided in Table 4.9 provides the alpha coefficients for each of the LS scales. Once again, all of the alpha coefficients were greater than 0.8, again suggesting a high degree of internal consistency for the Lack of Support subscale. The difference in the sample size for each of the scales is due to the method of calculation that deletes a respondent if there is a missing value for any of the applicable questions used in determining the respective index.

The results of the reliability testing presented in Tables 4.7, 4.8, and 4.9, all alpha coefficients 0.82 or greater, demonstrate an internal consistency that is as good or better in all respects than was demonstrated during the development of the JSS (Spielberger & Vagg, 1999).

Table 4.8: Means, Standard Deviations and Alpha Coefficients for the Job Pressure Index, Severity and Frequency Scales for all CCQI Client Organizations

INDEX	JSS JOB PRESSURE SUBSCALE Based on 10 Items	SEVERITY	FREQUENCY
Job Pressure	**JP-X**	**JP-S**	**JP-F**
Mean	21.3958	4.4033	4.3600
SD	12.7663	1.3680	1.9702
N	1778	1778	1778
Alpha	0.846657	0.843614	0.822775

Construct validity and sampling adequacy

Construct validity for the application of the JSS in this study was established by evaluating separate principle-components factor analysis for the 30 JSS Severity items, the 30 JSS Frequency items and the 30 Stress index items. An analysis of the scree test plot suggests a very strong single factor in each of the above cases with two or three weaker factors. An oblique rotation (promax) was used subsequent to the principle-components factor analysis to confirm the validity of the JSS Job Pressure and JSS Lack of Support subscales. Kaiser's measure of sampling adequacy (MSA), as discussed in Chapter 3, is a measure of whether the distribution of data is adequate for conducting factor analysis (Kaiser, 1970). Values greater than 0.9 can be considered to be "marvelous" (Kaiser & Rice, 1974, p.112). Values less than 0.5 require remedial action, either by deleting the offending variable or including other variables related to the offenders. The tables that follow will have a varying number of observations, since the statistical application drops the observation if there

Table 4.9: Means, Standard Deviations and Alpha Coefficients for the Lack of Support Index, Severity and Frequency Scales for all CCQI Client Organizations

INDEX	**JSS LACK OF SUPPORT SUBSCALE** **Based on 10 Items**	**SEVERITY**	**FREQUENCY**
Lack of Support	**LS-X**	**LS-S**	**LS-F**
Mean	21.2143	4.9860	3.4826
SD	15.0972	1.5361	2.0221
N	1790	1790	1790
Alpha	0.880806	0.847906	0.836788

is a single missing value.

The means, standard deviations, and MSA for the severity items are provided in Table 4.10. Question 5 "fellow workers not doing their job" was of most concern in the severity section of the stress analysis. The very low standard deviation for question 1 was due to the utilization of that question as a standardizing element for the first 30 questions. There were no mean scores that particularly standout as being lower than others, but the lowest severity mean score was insufficient personal time. The high MSA (0.93) suggests a marvelous (Kaiser & Rice, 1974) sample for conducting factor analysis.

The promax rotation of 30 severity items yielded seven factors that could be considered for subscale development. Evaluation of the inter-factor correlation, Table 4.11, and the rotated factor pattern, Appendix K, Table K.1, suggested that nine of the ten questions used in the original JSS development process for the Job Pressure subscale and eight of the ten used in the development of the Lack of Support subscale were the same. This

Table 4.10: Means, Standard Deviations and MSA for the JSS severity items from 1724 CCQI client respondents

	A1	A2	A3	A4	A5	A6
Mean	4.9976798	3.8381670	4.9907193	4.4019722	5.9605568	5.3590487
SD	0.1445282	2.2351397	2.4124666	2.0569988	2.1822528	2.4512364
	A7	A8	A9	A10	A11	A12
Mean	5.2412993	5.0759861	3.9918794	5.0939675	4.4559165	3.7975638
SD	2.0444310	2.2482399	2.1202786	2.3553667	2.0192989	2.2727983
	A13	A14	A15	A16	A17	A18
Mean	4.2447796	4.8265661	5.4263341	4.4756380	4.8921114	4.7169374
SD	2.6710441	2.3368584	2.2384863	2.0659437	2.4624791	2.2071831
	A19	A20	A21	A22	A23	A24
Mean	5.8526682	4.2175174	4.0870070	4.0411833	4.7558005	3.8950116
SD	2.2929119	2.0918312	2.3706158	2.3562658	2.2305055	2.0144569
	A25	A26	A27	A28	A29	A30
Mean	4.4889791	4.5597448	3.7291183	4.5568446	5.5406032	4.75
SD	2.3093329	2.1532745	2.2730726	2.3219447	2.2748158	2.3316503

Kaiser's Measure of Sampling Adequacy: Overall MSA = 0.93052713

consistency suggested that use of the JSS subscales as a part of this study was appropriate.

Using a minimum inter-factor correlation of 0.30 resulted in the assignment of questions associated with factors 1 and 5 to one group (Job Pressure) and questions associated with factors 2, 3, 4 and 6 to a second group (Lack of Support). This assignment of questions was consistent with the question assignment used for the severity items in the JSS. Appendix K, Table K.1, provides a listing of the rotated factor pattern loading by question and factor. The inter-factor correlation of 0.30 was chosen as a minimum for interpretation

Table 4.11: Inter-factor correlation for the severity items from 1724 CCQI client respondents

	FACTOR1	FACTOR2	FACTOR3	FACTOR4	FACTOR5	FACTOR6	FACTOR7
FACTOR1	1.00000	0.27279	0.28237	0.27822	0.34362	0.04885	0.09906
FACTOR2	0.27279	1.00000	0.49025	0.39599	0.33040	0.31779	-0.15289
FACTOR3	0.28237	0.49025	1.00000	0.27152	0.29362	0.36240	-0.07302
FACTOR4	0.27822	0.39599	0.27152	1.00000	0.31694	0.25412	-0.10068
FACTOR5	0.34362	0.33040	0.29362	0.31694	1.00000	0.20211	-0.09928
FACTOR6	0.04885	0.31779	0.36240	0.25412	0.20211	1.00000	-0.11619
FACTOR7	0.09906	-0.15289	-0.07302	-0.10068	-0.09928	-0.11619	1.00000

purposes, for this and subsequent indices, based on the data presented in Table 8 of the JSS Manual (Spielberger & Vagg, 1999).

The means, standard deviations, and Kaiser's Measure of Sampling Adequacy (MSA) for the frequency items are provided in Table 4.12. The high MSA (0.92) again suggests a marvelous (Kaiser & Rice, 1974) sample. Question 53, "frequent interruptions", had the highest mean score in the frequency section and question 43, "difficulty getting along with supervisor", had the lowest mean score as well as the smallest standard deviation.

The promax rotation of 30 frequency items yielded six factors that could be considered for subscale development. Evaluation of the inter-factor correlation, Table 4.13, and the rotated factor pattern, Appendix K, Table K.2 suggests that nine of the ten questions used in the JSS development for the Job Pressure subscale and eight of the ten used in the development of the Lack of Support subscale were the same. This consistency

Table 4.12: Means, Standard Deviations and MSA for the JSS frequency items from 1681 CCQI client respondents

	A31	A32	A33	A34	A35	A36
Mean	3.1189768	5.4116597	2.6287924	3.6436645	5.2064247	2.9762046
SD	2.7862550	3.5934076	3.3605171	2.8932963	3.2664757	3.1663266
	A37	A38	A39	A40	A41	A42
Mean	3.9339679	3.6412850	4.2004759	3.7959548	4.0624628	2.6389054
SD	3.1073713	3.3109392	3.3196242	3.3017864	2.9556686	3.0100838
	A43	A44	A45	A46	A47	A48
Mean	1.7031529	4.0374777	4.2260559	4.2986318	2.3670434	3.1624033
SD	2.5247434	3.3094956	3.2848950	3.1577651	2.7231956	3.1719252
	A49	A50	A51	A52	A53	A54
Mean	4.2486615	1.8024985	2.4283165	4.6876859	5.9595479	4.4931588
SD	3.7831125	2.5778855	3.0108546	3.6571062	3.2311034	3.2990052
	A55	A56	A57	A58	A59	A60
Mean	4.3706127	5.1326591	3.2486615	4.6198691	5.1130280	3.1118382
SD	3.4867187	3.3977774	3.4344248	3.2557729	3.3744951	3.0090117

Kaiser's Measure of Sampling Adequacy: Over-all MSA = 0.91645147

Table 4.13: Inter-factor correlation for the frequency items from 1681 CCQI client respondents

	FACTOR1	FACTOR2	FACTOR3	FACTOR4	FACTOR5	FACTOR6
FACTOR1	1.00000	0.29098	0.26681	0.39382	0.40779	0.12879
FACTOR2	0.29098	1.00000	0.49098	0.38602	0.22654	0.20534
FACTOR3	0.26681	0.49098	1.00000	0.38723	0.27888	0.21619
FACTOR4	0.39382	0.38602	0.38723	1.00000	0.32158	0.22797
FACTOR5	0.40779	0.22654	0.27888	0.32158	1.00000	0.10254
FACTOR6	0.12879	0.20534	0.21619	0.22797	0.10254	1.00000

with the original JSS research in the factor pattern of the frequency section of the JSS, like that of the severity section, suggests the appropriateness of the subscales for use in this study.

Again, using a minimum inter-factor correlation of 0.30 resulted in assigning questions from factors 1 and 5 to one group (Job Pressure) and questions from factors 2, 3, 4, and 5 to a second group (Lack of Support). This was again consistent with the question assignment during the original JSS research. Appendix K, Table K.2, provides a listing of the rotated factor pattern loading by question and factor.

The means, standard deviations, and Kaiser's Measure of Sampling Adequacy (MSA) for the stress index (JS-X) are provided in Table 4.14. The high MSA (0.92) again suggests a marvelous (Kaiser & Rice, 1974) sample for conducting factor analysis. Index items 5 and 29, both related to co-worker performance, had the highest scores. Index item 20, related to competition for advancement, had the lowest score.

The promax rotation of 30 stress index items yielded seven factors that could be considered for subscale development. Evaluation of the inter-factor correlation, Table 4.15, and the rotated factor pattern, Appendix K, Table K.3 suggests that nine of the ten questions used in the JSS development for the Job Pressure subscale and nine of the ten used in the development of the Lack of Support subscale were the same. This consistency in the factor pattern with the original JSS research in the stress index section, like that of the severity section and the frequency section once again suggests the appropriateness of the JSS for the sample used for this study.

Table 4.14: Means, Standard Deviations and MSA for the JSS stress index items from 1622 CCQI client respondents

	JS1	JS2	JS3	JS4	JS5	JS6
Mean	15.612824	22.265721	16.035142	17.312577	34.300247	19.748459
SD	13.987984	21.300014	23.943216	18.037703	26.762243	24.769703
	JS7	JS8	JS9	JS10	JS11	JS12
Mean	21.831073	22.030826	18.019112	23.105425	19.735512	11.784217
SD	20.908834	24.628122	19.203678	24.923114	19.026193	17.631020
	JS13	JS14	JS15	JS16	JS17	JS18
Mean	9.609124	23.141184	26.581998	19.991369	13.263256	17.770654
SD	18.164479	23.913460	25.277761	18.556413	18.439935	21.732668
	JS19	JS20	JS21	JS22	JS23	JS24
Mean	29.408138	9.359433	13.352651	22.135635	31.249692	18.852651
SD	30.044239	16.372391	20.904712	23.545592	23.808716	18.759226
	JS25	JS26	JS27	JS28	JS29	JS30
Mean	23.798397	26.087546	15.805179	24.052404	32.454994	18.846486
SD	24.201843	22.535017	21.717871	23.357382	26.801947	22.669619

Kaiser's Measure of Sampling Adequacy: Over-all MSA = 0.91531496

Again, using a minimum inter-factor correlation of 0.30 resulted in assigning factors 1 and 5 indices in one group (Job Pressure) and factors 2, 3 and 4 indices in a second group (Lack of Support) which was consistent with the assignment for the JSS stress index items. Appendix K, Table K.3, provides a listing of the rotated factor pattern loading by stress index item and factor.

The results of the factor analysis presented in Tables 4.11, K.1, 4.13, K.2, 4.15 and K.3 suggest that JSS questions 4, 7, 9, 11, 16, 23, 25, 26 and 27 coincided with the same questions used in the development of the JSS and used to define the Job Pressure subscale for

Table 4.15: Inter-factor correlation for the JSS stress index items from 1622 CCQI client respondents

	FACTOR1	FACTOR2	FACTOR3	FACTOR4	FACTOR5	FACTOR6	FACTOR7
FACTOR1	1.00000	0.32817	0.31382	0.43332	0.46402	0.23983	-0.00879
FACTOR2	0.32817	1.00000	0.47952	0.46349	0.30964	0.29208	0.01004
FACTOR3	0.31382	0.47952	1.00000	0.46441	0.27147	0.25143	-0.00732
FACTOR4	0.43332	0.46349	0.46441	1.00000	0.30339	0.27599	0.07625
FACTOR5	0.46402	0.30964	0.27147	0.30339	1.00000	0.18089	0.03529
FACTOR6	0.23983	0.29208	0.25143	0.27599	0.18089	1.00000	-0.19402
FACTOR7	-0.00879	0.01004	-0.00732	0.07625	0.03529	-0.19402	1.00000

the severity, frequency and stress index. The only difference for the Job Pressure subscale was in question 24 which was a part of the JSS developmental study and not part of the research reported in this study. Similarly, JSS questions 3, 5, 6, 8, 13, 14, 18, 21 and 29 coincided with the same questions used in the development of the JSS and used to define the Lack of Support subscale for the severity, frequency and stress index. The only difference for the Lack of Support subscale was in question 10 which was a part of the JSS developmental study and not part of the research reported in this study. The confirmation of question assignment with data collected as part of this research establishes construct validity.

Statistical Results

As discussed earlier, JS-X was chosen as the dependent variable because it most closely represented what W. Edwards Deming defined as fear. Additionally it included components of occupational stress that were related to job pressure and lack of organizational

support both of which were key components in analyzing the source of fear in organizations involved in quality improvement programs.

The most appropriate linear relationship between the dependent variable, fear/occupational stress (JS-X), and the seven independent variables: sex, age, years of education, years of employment, level of quality implementation, job type and organization size was developed using general linear regression on the 1796 observations from the CCQI client organizations. This analysis of the main effects suggested that all of the independent variables were statistically significant except sex and level of quality implementation. Means analysis of the Stress Index (JS-X) using the Bonferroni and Scheffe tests by job type indicated that supervisor (job type 1) was the only job type that was significantly different than the other four [manager (0), professional (2), clerical (3) and worker (4)]. The results of the Bonferroni test for organization size are provided in Table 4.16 and job type in Table 4.17. Any differences noted in tabular totals of the number of observations resulted from the elimination of observations when calculations involved missing values. For example, this is evident in Table 4.16 where the actual number of participants from large organizations was 1248 and 548 from small organizations.

Table 4.16: Bonferroni T test for the organization size categories

Bonferroni Grouping	Number	Mean	Organization Size
A	1129	21.217	Large
B	369	19.078	Small

Table 4.17: Bonferroni T test for the five job types

Job type	Number	Job type Comparison	Mean	Difference Between Means
Manager (0)	197	0 to 1	20.546	-3.99*
		0 to 2		0.75
		0 to 3		0.22
		0 to 4		0.22
Supervisor (1)	158	1 to 0	24.532	3.99*
		1 to 2		4.74*
		1 to 3		4.20*
		1 to 4		4.20*
Professional (2)	308	2 to 0	19.793	-0.75
		2 to 1		-4.74*
		2 to 3		-0.54
		2 to 4		-0.53
Clerical (3)	181	3 to 0	20.331	-0.22
		3 to 1		-4.20*
		3 to 2		0.54
		3 to 4		0.00
Worker (4)	654	4 to 0	20.327	-0.22
		4 to 1		-4.20*
		4 to 2		0.53
		4 to 3		0.00

*$p<0.05$

Additional linear model analysis was conducted to evaluate only the main effects. This analysis suggested that all of the main effects were significant ($p<0.05$) contributors to the Stress Index (JS-X) except sex and level of quality improvement. The value of R-Square for each analysis was between 5.0% and 10.0%. These small values of R-Square suggest that the variability of the data is not well explained by the model chosen. An analysis

conducted with sex as the only variable resulted in sex remaining an insignificant contributor. Similar analysis with job type as the only independent variable confirmed its significance ($p<0.05$). Correlation analysis conducted between JS-X and the continuous independent variables; education, years of employment, level of quality improvement and age confirmed the significance ($p<0.05$) of each of the variables tested. Only the level of quality improvement remained an insignificant contributor to JS-X.

Findings Concerning the Hypotheses

The findings for each hypothesis are reported in this section. Each finding is based on the general linear model analysis (R-Square=0.056) that considered the main effects without interactions and is reported in Table 4.18.

Table 4.18: Analysis of variance of JS-X, calculated from 1796 responses to the JSS, and tests of the hypotheses using a general linear model and main effects only

Source	df	SS	MS	F	Pr>F
Job type	4	2819.88	704.97	6.03	0.0001
Sex	1	146.88	146.88	1.26	0.2623
Org Size	1	583.24	583.24	4.99	0.0256
Educ	1	550.62	550.62	4.71	0.0301
Tenure	1	4803.36	4803.36	41.12	0.0001
Qualimp	1	0.08	0.08	0.00	0.9797
Age	1	3309.99	3309.99	28.33	0.0001

Hypothesis 1

H_0: There is no significant correlation between the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS) and the level of quality implementation given the other variables (sex, years of employment, organization size, age of the respondent, years of respondent education and job type) in the model.

The results shown in Table 4.18 indicate no significant correlation between fear/anxiety, as measured by JS-X, and the level of quality implementation of the participating organizations at the 0.05 significance level using the GLM procedure. The F value for the level of quality implementation was 0.00. Therefore, the null hypothesis was accepted.

Hypothesis 2

H_0: There is no significant difference in the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS), for males and females given the other variables (level of quality implementation, years of employment, organization size, age of the respondent, years of respondent education and job type) in the model.

The results shown in Table 4.18 indicate no significant difference between fear/anxiety, as measured by JS-X, for males and females at the 0.05 significance level using the GLM procedure. The F value for the sex of the respondent was 1.26. Therefore, the null hypothesis was accepted.

Hypothesis 3

H_0: There is no significant correlation between the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS) and the number of years the respondent has been employed by the organization given the other variables (level of quality implementation, sex, organization size, age of the respondent, years of respondent education and job type) in the model.

The results shown in Table 4.18 indicate a significant correlation between fear/anxiety, as measured by JS-X, and the number of years the respondent has been

employed by the organization at the 0.05 significance level using the GLM procedure. The F value for the number of years of employment was 41.12. Therefore, the null hypothesis was rejected.

Hypothesis 4

H_0: There is no significant difference in the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS), for large and small organizations given the other variables (level of quality implementation, sex, years of employment, age of the respondent, years of respondent education and job type) in the model.

The results shown in Table 4.18 indicate a significant difference between fear/anxiety, as measured by JS-X, for large and small organizations at the 0.05 significance level using the GLM procedure. The F value for organization size was 4.99. Therefore, the null hypothesis was rejected.

Hypothesis 5

H_0: There is no significant correlation between the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS) and the age of the respondent given the other variables (level of quality implementation, sex, years of employment, organization size, years of respondent education and job type) in the model.

The results shown in Table 4.18 indicate a significant correlation between fear/anxiety, as measured by JS-X, and the age of the respondent at the 0.05 level using the GLM procedure. The F value for organization size was 28.33. Therefore, the null hypothesis was rejected.

Hypothesis 6

H_0: There is no significant correlation between the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS) and the number of years of respondent education given the other variables (level of quality implementation, sex, years of employment, organization size, age of the respondent and job type) in the model.

The results shown in Table 4.18 indicate a significant correlation between fear/anxiety, as measured by JS-X, and the number of years of respondent education at the 0.05 significance level using the GLM procedure. The F value for the number of years of respondent education was 4.71. Therefore, the null hypothesis was rejected.

Hypothesis 7

H_0: There is no significant difference in the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS), for the various job types given the other variables (level of quality implementation, sex, years of employment, organization size, age of the respondent and years of respondent education) in the model.

The results shown in Table 4.18 indicate significant differences between fear/anxiety, as measured by JS-X, for the various job types at the 0.05 significance level using the GLM procedure. The F value for respondent job type was 6.03. Therefore, the null hypothesis was rejected.

Further testing using the GLM procedure on unconditional models with each of the seven independent variables considered separately in seven different models resulted in the same five variables (job type, organization size, years of education, tenure, age) being significant at the $p<0.05$ level. Sex and level of quality implementation remained insignificant when considered in independent models. When interactions were added to the conditional model the only variables/interactions that remained significant were tenure and the tenure by age interaction suggesting that the significance of the main effects was masked by multicollinearity.

Based on the data collected in this study and the analysis conducted, the following is the best representation of a regression equation (R-Square = 0.056) that estimates the level of fear (JS-X) given those variables that were found to be significant.

$$(JS\text{-}X)_i = 18.74 - 0.94X_1 + 3.52X_2 - 1.72X_3 - 0.66X_4 + 1.48X_5 + 0.40X_6 + 0.25X_7 - 0.14X_8$$

Where: X_1=1 for job type 0 (manager) and other job types $X_2=X_3=X_4=0$

X_2=1 for job type 1 (supervisor) and other job types $X_1=X_3=X_4=0$

X_3=1 for job type 2 (professional) and other job types $X_1=X_2=X_4=0$

X_4=1 for job type 3 (clerical) and other job types $X_1=X_2=X_3=0$

For job type 4 (worker) $X_1=X_2=X_3=X_4=0$

X_5=1 for large organizations and 0 for small organizations

X_6=numerical value representing number of years of formal education

X_7=numerical value representing the number of years employed by the organization

X_8=numerical value representing the age of the individual

Summary

The Job Stress Survey (JSS) was administered to 1858 employees of twenty-five organizations located in the mid-west and Utah to assess the level of fear/anxiety as measured by the Job Stress index (JS-X) component of the JSS. Twenty-two, 1796 participants, of the organizations had or were currently involved in the continuous quality improvement education process provided by the Center for Continuous Quality Improvement in Ames, Iowa. A control group consisting of the three remaining organizations, 62 participants, had no involvement with CCQI, but agreed to participate. The control group appeared to be too small for any meaningful comparisons with the CCQI group and was not analyzed beyond making informational comparisons. The Cronbach Alpha reliability estimates were calculated for each index (JS-X, JP-X and LS-X) as well as for the individual stress and

frequency items. All alphas were greater than 0.80. The construct validity of the instrument was established by utilizing principle components factor analysis followed by an oblique rotation (promax). This process recreated, as closely as possible, the methodology used during the original instrument development and yielded essentially the same results with respect to subscale development.

Overall, supervisors had a significantly higher mean JS-X than any of the other four job types(manager, professional, clerical, worker). When considering the organization size, the large organizations, greater than 150 employees, scored significantly higher than the small organizations on the JS-X. Evaluation of the main effects independent of their interactions but considered conditionally, i.e. other main effects remaining in the model, suggested that job type, organization size, respondent education, tenure and age were all significant contributors to JS-X. Under these same conditions, sex and level of quality improvement were the only two main effects that were not significant at the $p<0.05$ level. Separate unconditional analyses of each of the main effects produced the same result. The categories of organizations; manufacturing, service and agriculture were compared using a GLM contrast procedure and found not to be significantly different with respect to JS-X. An analysis using each organization as an independent variable and as a dummy variable in a GLM procedure confirmed that there was no clustering. Therefore, the collection of data on an organizational basis had no significant effect on the determination of JS-X.

The best regression equation for the assessment of individual fear based on the data and analysis procedures of the study was:

$$(JS\text{-}X)_i = 18.74 - 0.94X_1 + 3.52X_2 - 1.72X_3 - 0.66X_4 + 1.48X_5 + 0.40X_6 + 0.25X_7 - 0.14X_8$$

Where: X_1=1 for job type 0 (manager) and other job types X_2=X_3=X_4=0

X_2=1 for job type 1 (supervisor) and other job types X_1=X_3=X_4=0

X_3=1 for job type 2 (professional) and other job types X_1=X_2=X_4=0

X_4=1 for job type 3 (clerical) and other job types X_1=X_2=X_3=0

For job type 4 (worker) X_1=X_2=X_3=X_4=0

X_5=1 for large organizations and 0 for small organizations

X_6=numerical value representing number of years of formal education

X_7=numerical value representing the number of years employed by the organization

X_8=numerical value representing the age of the individual

The value of R-Square (0.056) is quite small indicating that a very small portion of the variability was described by the model represented by the regression equation provided. A linear model was not developed for either the JSS Job Pressure index or the JSS Lack of Support index because the Stress index was the index of interest since it was being used as the measure of fear for this study.

CHAPTER 5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

An introduction, a review of literature, the methodology, and the results and findings were presented in Chapters 1 through 4 of this study. This chapter reviews the problem, purpose and hypotheses of the study. A brief summary is followed by a presentation of conclusions relative to the findings associated with each hypothesis. The chapter concludes with recommendations for future research.

Restatement of the Problem

The problem addressed by this study is that the impact of quality improvement program implementation on employee fear/anxiety has not been adequately investigated.

Restatement of the Purpose

The purposes of the study were:

1. to determine the impact of the Center for Continuous Quality Improvement (CCQI) quality improvement program implementation on fear/anxiety in organizations.
2. to identify whether level of quality implementation, sex, years of formal education, years of employment with the organization, organization size, age or job type significantly influence the level of fear/anxiety in organizations that are or have been involved in the CCQI quality improvement education process

Summary

The Job Stress Survey (JSS) was administered to employees within twenty-four Iowa organizations and one Utah organization. Twenty-two of the organizations were being or had been educated in the continuous quality improvement process by the Center for Continuous Quality Improvement (CCQI) located at the Iowa State University Research Park in Ames,

Iowa. One thousand eight hundred fifty-eight usable responses were compiled from five different job types (manager, supervisor, professional, clerical, worker), 1796 of these were from organizations that had been educated in continuous quality improvement by CCQI. Since there were so few responses from organizations that had not participated in the CCQI education process (control group), they were only used for informational comparisons.

The reliability and validity of the JSS for this research study was established by replicating as closely as possible the procedure used to develop the JSS by Dr. Charles Spielberger and showing that the resulting alpha coefficients and subscales were consistent with the original JSS outcomes.

The Organization Quality Program Implementation Assessment (OQPIA) was used to measure the level of quality implementation in participating organizations. The OQPIA was developed using portions of the Malcolm Baldrige National Quality Award (MBNQA) that were consistent with those components taught as part of the CCQI education process. The OQPIA was validated by a panel of experts, to assure content validity before it was used to rate the 22 CCQI client organizations on their level of quality implementation.

The results were generated using various statistical tools that yielded descriptive and inferential outputs. The seven conditional hypotheses were tested using comparison of mean responses and a general linear model (GLM) procedure.

Conclusions

Hypothesis 1

It was hypothesized that there was no significant correlation between the level of organizational fear as measured by the JSS and the level of quality implementation as

measured by the OQPIA given the other variables (sex, years of employment, organization size, age of the respondent, years of respondent education and job type) in the model.

Findings: The findings indicated that there was no significant correlation between the level of fear and the OQPIA score, at the $p<0.05$ level, given the other six independent variables in the model. Further testing using an unconditional model with the level of quality implementation (OQPIA score) as the only main effect was consistent with the outcome of the conditional testing.

Discussion: Since the tests with both unconditional and conditional models provided the same results, it is concluded that the lack of significance of the level of quality implementation is not due to discrepant results that could have been caused by the difference in partial and ordinary F test procedures.

The mean OQPIA score varied widely between organizations, with the small organizations having a higher mean score than the large organizations, but there was no clear pattern of OQPIA ratings that would obviously contribute to this lack of correlation.

The finding of no significant relationship between fear and the level of quality implementation may have been affected by a lack of instrument validity for measuring the level of quality implementation and/or poor rater reliability. The OQPIA was developed from an existing evaluation tool that was reduced in scope to be consistent with this study. A panel of experts established face validity of the OQPIA. Organizational OQPIA ratings were generated by individuals who had been involved with the organizations on a regular basis. These individuals were separately knowledgeable of specific organizations, but not all individuals were knowledgeable of all organizations. It was assumed that because the raters

had received the same training and their organizational training sessions were monitored to assure uniformity, that any differences in establishing the organizational OQPIA rating would be random and not affect the outcome. Any of these issues considered individually or in combination may have contributed to type II error.

Hypothesis 2

It was hypothesized that there was no significant difference in the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS), for males and females given the other variables (level of quality implementation, years of employment, organization size, age of the respondent, years of respondent education and job type) in the model.

Findings: The findings indicated that there was no significant difference between the level of fear for males and females, at the $p<0.05$ level, given the other six independent variables in the model. Further testing using an unconditional model with sex as the only main effect was consistent with the outcome of the conditional testing.

Discussion: Since the tests with both unconditional and conditional models provided the same results, it is concluded that the lack of significance of sex is not due to discrepant results that could have been caused by the difference in partial and ordinary F test procedures. Earlier studies (Dowd, 1993) suggested that sex was significantly related to anxiety in in applications that utilized the Beck Anxiety Inventory. Later studies, however, that used the JSS (Spielberger & Vagg, 1999) only found sex to be significant when considering the JSS Job Pressure subscale for a senior military population of 377 individuals, 23 of whom were female.

Hypothesis 3

It was hypothesized that there was no significant correlation between the level of organizational fear as measured by the JSS and the number of years the respondent has been employed by the organization given the other variables (level of quality implementation, sex, organization size, age of the respondent, years of respondent education and job type) in the model.

Findings: The findings indicated that there was a significant correlation between the level of fear and years of employment, at the $p<0.05$ level, given the other six independent variables in the model. Further testing using an unconditional model with years of employment as the only main effect was consistent with the outcome of the conditional testing.

Discussion: Since the tests with both unconditional and conditional models provided the same results, it is concluded that the significance of the number of years of employment is not due to discrepant results that could have been caused by the difference in partial and ordinary F test procedures. These same tests suggested a positive coefficient for the number of years of employment (tenure). Therefore, it is concluded, based on the data from this study, that the more tenure with an organization the greater the possibility for a higher level of fear/anxiety. This is contrary to earlier research (Parasuraman & Alutto, 1984) which suggested that experiential years would develop coping mechanisms.

Hypothesis 4

It was hypothesized that there was no significant difference in the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS), for large and small

organizations given the other variables (level of quality implementation, sex, years of employment, age of the respondent, years of respondent education and job type) in the model.

Findings: The findings indicated that there was a significant difference between the level of fear for large and small organizations, at the $p<0.05$ level, given the other six independent variables in the model. Further testing using an unconditional model with organization size as the only main effect was consistent with the outcome of the conditional testing.

Discussion: Since the tests with both unconditional and conditional models provided the same results, it is concluded that the significance of organization size is not due to discrepant results that could have been caused by the difference in partial and ordinary F test procedures. These same tests suggested a positive coefficient for organization size. Therefore, it is concluded, based on the data from this study, that the larger an organization the greater the possibility for an increased level of fear/anxiety.

Hypothesis 5

It was hypothesized that there was no significant correlation between the level of organizational fear, as measured by the JSS, and the age of the respondent given the other variables (level of quality implementation, sex, years of employment, organization size, years of respondent education and job type) in the model.

Findings: The findings indicated that there was a significant correlation between the level of fear and age of the respondent, at the $p<0.05$ level, given the other six independent variables in the model. Further testing using an unconditional model with age of the respondent as the only main effect was consistent with the outcome of the conditional testing.

Discussion: Since the tests with both unconditional and conditional models provided the same results, it is concluded that the significance of the age of the respondent is not due to discrepant results that could have been caused by the difference in partial and ordinary F test procedures. These same tests suggested a negative coefficient for age. Therefore, it is concluded, based on the data from this study, the younger the individual the greater the possibility for an increased level of fear/anxiety. This result might be considered inconsistent with the results of the tenure analysis. However, it seems appropriate to conclude that age is the more powerful of the two variables since, when interactions were evaluated, the tenure by age interaction suggested a negative correlation even with the large amount of multicollinearity in the model.

Hypothesis 6

It was hypothesized that there was no significant correlation between the level of organizational fear as measured by the JSS and the number of years of respondent education given the other variables (level of quality implementation, sex, years of employment organization size, age of the respondent, and job type) in the model.

Findings: The findings indicated that there was a significant correlation between the level of fear and years of respondent education, at the $p<0.05$ level, given the other six independent variables in the model. Further testing using an unconditional model with years of respondent education as the only main effect was consistent with the outcome of the conditional testing.

Discussion: Since the tests with both unconditional and conditional models provided the same results, it is concluded that the significance of the number of years of respondent

education is not due to discrepant results that could have been caused by the difference in partial and ordinary F test procedures. These same tests suggested a positive coefficient for the number of years of respondent education, therefore, it is concluded, based on the data from this study, that the more educated the respondent the greater the possibility for a higher level of fear/anxiety.

Hypothesis 7

It was hypothesized that there was no significant correlation between the level of organizational fear as measured by the JSS for the various job types given the other variables (level of quality implementation, sex, years of employment organization size, age of the respondent, and years of respondent education) in the model.

Findings: The findings indicated that there was a significant correlation between the level of fear and the various job types, at the $p<0.05$ level, given the other six independent variables in the model. Further testing using an unconditional model with years of respondent education as the only main effect was consistent with the outcome of the conditional testing. Means testing showed a significant difference between job type 1 (supervisor) and the other four job types (manager, professional, clerical and worker). Additional testing using the GLM procedure with job type considered at two levels, supervisor and other, was consistent with the above finding.

Discussion: Since the tests with both unconditional and conditional models provided the same results, it is concluded that the significance of job type is not due to discrepant results that could have been caused by the difference in partial and ordinary F test procedures. These same tests suggested a positive coefficient for job type 1 (supervisor) and negative

coefficients for the other four job types. Therefore, it is concluded, based on the data from this study, that supervisors have a greater probability for a higher level of job related fear/anxiety. This significantly higher measured level of fear at the supervisory level may be caused by a wide variety of issues or situations such as: organizational structure, organization size, type of organization. In each case though, the fact that the supervisor is the single individual that is required to deal with the largest number of subordinates and superiors on a routine basis may be the major reason for this difference.

Recommendations for Organizations

Based on the findings and conclusions of this study, organizations should consider the following:

1. Organization size, years of employment, years of education, age, and job type should be routinely considered as strategies are formulated for the organizational change process.
2. Because of the higher level of fear/anxiety exhibited by supervisors, supplemental training should be developed and included for supervisors as part of the change process.
3. Although the level of quality implementation did not specifically have a significant statistical impact on the level of fear/anxiety it should not be ignored as a major change in the philosophical approach to the operation of organizations.

Further Research

The following recommendations for further research are based on the results of this study:

1. It is recommended that further research be conducted to identify the reasons for the difference in the level of fear/anxiety experienced by those individuals in supervisory positions.
2. Further research is needed to explore the impact of quality implementation on fear/anxiety in organizations. This research should be experimental in nature and include a control group of organizations that had no continuous quality improvement education compared to a group of organizations that had received the education.
3. Future research is needed to assess methodologies and procedures to allow for the evaluation of interactions without being confounded by multicollinearity.

APPENDIX A. JOB STRESS SURVEY (JSS)

Job Stress Survey[1]

Job stress can have serious effects on the lives of employees and their families. The impact of stressful job events is influenced by both the *amount* of stress associated with a particular event and the *frequency* of its occurrence. The purpose of this survey is to determine your perception of important sources of stress in your work. The survey consists of 30 statements that describe job-related events identified as stressful by employees in a variety of occupations. You will be asked to rate both the *amount* of stress associated with each event, and then, the *number of times* within the last 6 months that you have experienced each event.

In making your ratings, use all of your knowledge and experience, taking into account the amount of time and energy that you feel would be necessary in adjusting to, or coping with the event. Base your ratings on your personal experience as well as what you observed to be the case for others. Since some people adapt more readily than others, please give your opinion of the average amount of stress that you feel is associated with each event, rather than the extreme.

The first event, ASSIGNMENT OF DISAGREEABLE DUTIES, was consistently rated by persons engaged in a variety of occupations as producing an average amount of stress. This event has been given a rating of "5" and will be used as the *standard* for evaluating the other events in the Job Stress Survey. Your task is to compare each event with the *standard*, and then assign a number "1" to "9" (the "0" will be used in scoring the second 30 responses) to indicate if you judge the event to be more or less stressful than being assigned disagreeable duties.

Enter your name, sex, age, years of education, job title, and today's date in the appropriate spaces below. Then, turn to page 2. Read the instructions for **Part I** and rate statements 1-30.

Name_____Sex _____Age_____

Education_____Job Title_____Date_____

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Part I. Instructions: For those events that you feel are more stressful than the standard, circle a number proportionately larger than "5". If you feel an event is less stressful than the standard, circle a number proportionately lower than "5". For events judged to produce approximately the same amount of stress as the ASSIGNMENT OF DISAGREEABLE DUTIES, circle the number "5".

STRESSFUL JOB-RELATED EVENTS	Amount of Stress								
	Low				Moderate				High
1. ASSIGNMENT OF DISAGREEABLE DUTIES	1	2	3	4	5	6	7	8	9
2. Working overtime	1	2	3	4	5	6	7	8	9
3. Lack of opportunity of advancement	1	2	3	4	5	6	7	8	9
4. Assignment of new or unfamiliar duties	1	2	3	4	5	6	7	8	9
5. Fellow workers not doing their job	1	2	3	4	5	6	7	8	9
6. Inadequate support by supervisor	1	2	3	4	5	6	7	8	9
7. Dealing with crisis situations	1	2	3	4	5	6	7	8	9
8. Lack of recognition for good work	1	2	3	4	5	6	7	8	9
9. Performing tasks not in the job description	1	2	3	4	5	6	7	8	9
10. Inadequate or poor quality equipment	1	2	3	4	5	6	7	8	9
11. Assignment of increased responsibility	1	2	3	4	5	6	7	8	9
12. Periods of inactivity	1	2	3	4	5	6	7	8	9
13. Difficulty getting along with supervisor	1	2	3	4	5	6	7	8	9
14. Experiencing negative attitudes toward the organization	1	2	3	4	5	6	7	8	9
15. Insufficient personnel to adequately handle an assignment	1	2	3	4	5	6	7	8	9
16. Making critical on-the-spot decisions	1	2	3	4	5	6	7	8	9
17. Personal insult from customer / consumer / colleague	1	2	3	4	5	6	7	8	9
18. Lack of participation in policy making decisions	1	2	3	4	5	6	7	8	9
19. Inadequate salary	1	2	3	4	5	6	7	8	9
20. Competition for advancement	1	2	3	4	5	6	7	8	9
21. Poor or inadequate supervision	1	2	3	4	5	6	7	8	9
22. Noisy work area	1	2	3	4	5	6	7	8	9
23. Frequent interruptions	1	2	3	4	5	6	7	8	9
24. Frequent changes from boring to demanding activities	1	2	3	4	5	6	7	8	9
25. Excessive paperwork	1	2	3	4	5	6	7	8	9
26. Meeting deadlines	1	2	3	4	5	6	7	8	9
27. Insufficient personal time (for example, coffee breaks, lunch)	1	2	3	4	5	6	7	8	9
28. Covering work for another employee	1	2	3	4	5	6	7	8	9
29. Poorly motivated co-workers	1	2	3	4	5	6	7	8	9
30. Conflicts with other departments	1	2	3	4	5	6	7	8	9

Part II. Instructions: For each of the job-related events listed in Part I, please indicate the approximate *number of days* during the past *6 months* on which you have personally experienced this event. Do this by circling a number from "0" to "9+" for each event. Circle "0" if the event did *not occur* during the past 6 months; circle the number "9+" for each event you experienced personally on 9 or more days during the past 6 months.

STRESSFUL JOB-RELATED EVENTS	Number of days on which the event occurred during the past 6 months									
31. Assignment of disagreeable duties	0	1	2	3	4	5	6	7	8	9+
32. Working overtime	0	1	2	3	4	5	6	7	8	9+
33. Lack of opportunity of advancement	0	1	2	3	4	5	6	7	8	9+
34. Assignment of new or unfamiliar duties	0	1	2	3	4	5	6	7	8	9+
35. Fellow workers not doing their job	0	1	2	3	4	5	6	7	8	9+
36. Inadequate support by supervisor	0	1	2	3	4	5	6	7	8	9+
37. Dealing with crisis situations	0	1	2	3	4	5	6	7	8	9+
38. Lack of recognition for good work	0	1	2	3	4	5	6	7	8	9+
39. Performing tasks not in the job description	0	1	2	3	4	5	6	7	8	9+
40. Inadequate or poor quality equipment	0	1	2	3	4	5	6	7	8	9+
41. Assignment of increased responsibility	0	1	2	3	4	5	6	7	8	9+
42. Periods of inactivity	0	1	2	3	4	5	6	7	8	9+
43. Difficulty getting along with supervisor	0	1	2	3	4	5	6	7	8	9+
44. Experiencing negative attitudes toward the organization	0	1	2	3	4	5	6	7	8	9+
45. Insufficient personnel to adequately handle an assignment	0	1	2	3	4	5	6	7	8	9+
46. Making critical on-the-spot decisions	0	1	2	3	4	5	6	7	8	9+
47. Personal insult from customer / consumer / colleague	0	1	2	3	4	5	6	7	8	9+
48. Lack of participation in policy making decisions	0	1	2	3	4	5	6	7	8	9+
49. Inadequate salary	0	1	2	3	4	5	6	7	8	9+
50. Competition for advancement	0	1	2	3	4	5	6	7	8	9+
51. Poor or inadequate supervision	0	1	2	3	4	5	6	7	8	9+
52. Noisy work area	0	1	2	3	4	5	6	7	8	9+
53. Frequent interruptions	0	1	2	3	4	5	6	7	8	9+
54. Frequent changes from boring to demanding activities	0	1	2	3	4	5	6	7	8	9+
55. Excessive paperwork	0	1	2	3	4	5	6	7	8	9+
56. Meeting deadlines	0	1	2	3	4	5	6	7	8	9+
57. Insufficient personal time (for example, coffee breaks, lunch)	0	1	2	3	4	5	6	7	8	9+
58. Covering work for another employee	0	1	2	3	4	5	6	7	8	9+
59. Poorly motivated co-workers	0	1	2	3	4	5	6	7	8	9+
60. Conflicts with other departments	0	1	2	3	4	5	6	7	8	9+

APPENDIX B. AUTHORIZATION TO USE THE JOB STRESS SURVEY FOR RESEARCH

University of South Florida
USF

March 2, 1999

Chester D. Ward, Graduate Student
Industrial Education & Technology
Iowa State University
212 Trailridge Rd.
Ames, Iowa 5001
Fax: (515) 296-7096

Dear Mr. Ward:

In response to your recent request, I am very pleased to give you permission to reproduce the Job Stress Survey (JSS) for your dissertation research project entitled:

Quality Program Induced Change: Its Impact on Stress, Fear, and Anxiety

It is my understanding that your research will be carried out at:

Iowa State University/Ames, Iowa

This permission is contingent on your agreement to share your research findings with us. I look forward to receiving further information about your procedures and the results of your study as this becomes available.

Best wishes on your dissertation research project.

Sincerely,

Charles D. Spielberger, Ph.D.
Distinguished Research Professor
Director, Center for Research in Behavioral
Medicine and Health Psychology
email: spielber@chumal.cas.usf.edu

CDS/csd

APPENDIX C. JOB STRESS SURVEY MODIFIED FOR COMPUTER SCORING

Job Stress Survey[1,2]

Job stress can have serious effects on the lives of employees and their families. The impact of stressful job events is influenced by both the *amount* of stress associated with a particular event and the *frequency* of its occurrence. The purpose of this survey is to determine your perception of important sources of stress in your work. The survey consists of 30 statements that describe job-related events identified as stressful by employees in a variety of occupations. You will be asked to rate both the *amount* of stress associated with each event, and then, the *number of times* within the last 6 months that you have experienced each event.

In making your ratings, use all of your knowledge and experience, taking into account the amount of time and energy that you feel would be necessary in adjusting to, or coping with the event. Base your ratings on your personal experience as well as what you observed to be the case for others. Since some people adapt more readily than others, please give your opinion of the average amount of stress that you feel is associated with each event, rather than the extreme.

The first event, ASSIGNMENT OF DISAGREEABLE DUTIES, was consistently rated by persons engaged in a variety of occupations as producing an average amount of stress. This event has been given a rating of "5" and will be used as the *standard* for evaluating the other events in the Job Stress Survey. Your task is to compare each event with the *standard*, and then assign a number "1" to "9" (the "0" will be used in scoring the second 30 responses) to indicate if you judge the event to be more or less stressful than being assigned disagreeable duties.

A computer scored response sheet has been provided for you to record each of your 60 responses and should take between 10 and 15 minutes to complete. The general information should be completed prior to beginning the survey.

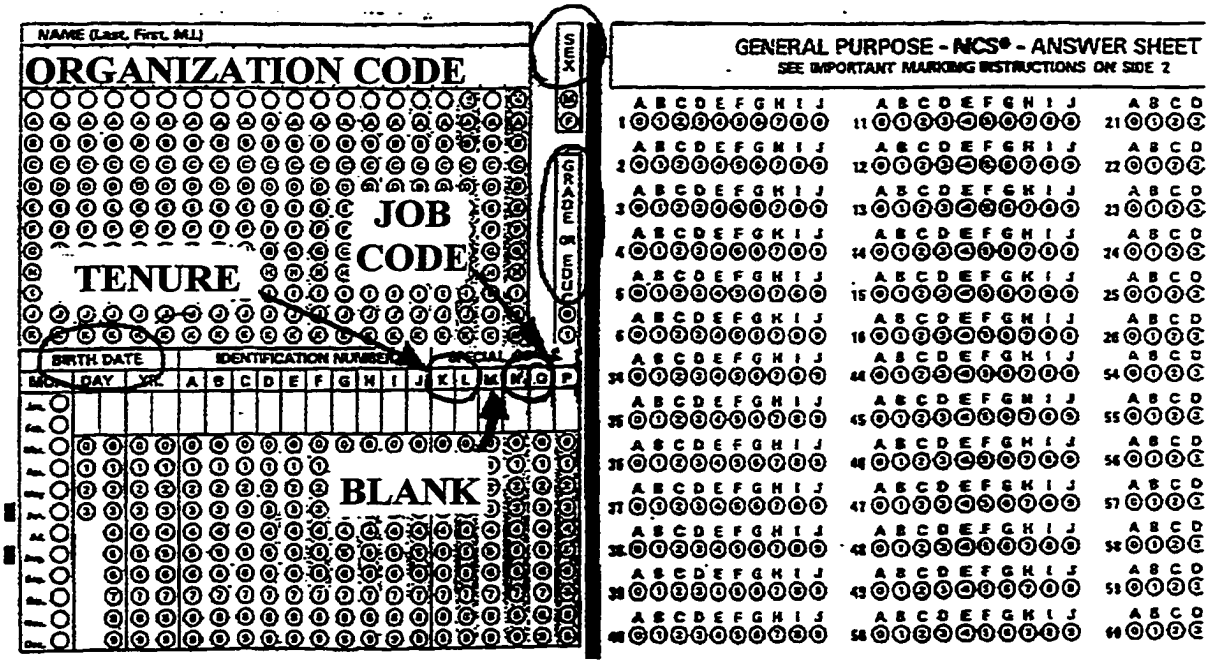
---

[1] Authorization to utilize the JSS provided by Charles D. Spielberger, Ph.D. March 1, 1999.

Each response sheet has a three digit organization code already completed in the "name section". Complete the "sex" block. In the "grade/education" block complete with total years of education (HS=12, college grad=16). Complete the "birth date" block. A predetermined code that is organizationally related is provided in the "Identification Number" block. Complete the "**Special Codes Block columns K and L**" with a **two digit number** representing your **tenure (total number of years)** with this organization, leave "**M**" blank, and complete "**N**" with one of the following codes that **best describes your job type**: **(0)** manager, **(1)** supervisor, **(2)** professional, **(3)** clerical, **(4)** worker. When the general information has been completed turn to page 3, read the instructions for **Part 1** and rate statements 1-30 on the computer scored response sheet using a number 2 pencil. When Part 1 is complete turn to page 4, read the instructions for **Part 2** and rate statements 1-30 on the computer scored response sheet using a number 2 pencil.

All responses will be confidential. A summary of this study will be provided to your organization and should be made available to you.

Participation in this research survey is entirely voluntary and nonparticipation will have no impact on individual evaluations.



Part L Instructions: For those events that you feel are more stressful than the standard, circle a number proportionately larger than "5". If you feel an event is less stressful than the standard, circle a number proportionately lower than "5". For events judged to produce approximately the same amount of stress as the ASSIGNMENT OF DISAGREEABLE DUTIES, circle the number "5".

STRESSFUL JOB-RELATED EVENTS	Amount of Stress								
	Low			Moderate					High
1. ASSIGNMENT OF DISAGREEABLE DUTIES	1	2	3	4	5	6	7	8	9
2. Working overtime	1	2	3	4	5	6	7	8	9
3. Lack of opportunity of advancement	1	2	3	4	5	6	7	8	9
4. Assignment of new or unfamiliar duties	1	2	3	4	5	6	7	8	9
5. Fellow workers not doing their job	1	2	3	4	5	6	7	8	9
6. Inadequate support by supervisor	1	2	3	4	5	6	7	8	9
7. Dealing with crisis situations	1	2	3	4	5	6	7	8	9
8. Lack of recognition for good work	1	2	3	4	5	6	7	8	9
9. Performing tasks not in the job description	1	2	3	4	5	6	7	8	9
10. Inadequate or poor quality equipment	1	2	3	4	5	6	7	8	9
11. Assignment of increased responsibility	1	2	3	4	5	6	7	8	9
12. Periods of inactivity	1	2	3	4	5	6	7	8	9
13. Difficulty getting along with supervisor	1	2	3	4	5	6	7	8	9
14. Experiencing negative attitudes toward the organization	1	2	3	4	5	6	7	8	9
15. Insufficient personnel to adequately handle an assignment	1	2	3	4	5	6	7	8	9
16. Making critical on-the-spot decisions	1	2	3	4	5	6	7	8	9
17. Personal insult from customer / consumer / colleague	1	2	3	4	5	6	7	8	9
18. Lack of participation in policy making decisions	1	2	3	4	5	6	7	8	9
19. Inadequate salary	1	2	3	4	5	6	7	8	9
20. Competition for advancement	1	2	3	4	5	6	7	8	9
21. Poor or inadequate supervision	1	2	3	4	5	6	7	8	9
22. Noisy work area	1	2	3	4	5	6	7	8	9
23. Frequent interruptions	1	2	3	4	5	6	7	8	9
24. Frequent changes from boring to demanding activities	1	2	3	4	5	6	7	8	9
25. Excessive paperwork	1	2	3	4	5	6	7	8	9
26. Meeting deadlines	1	2	3	4	5	6	7	8	9
27. Insufficient personal time (for example, coffee breaks, lunch)	1	2	3	4	5	6	7	8	9
28. Covering work for another employee	1	2	3	4	5	6	7	8	9
29. Poorly motivated co-workers	1	2	3	4	5	6	7	8	9
30. Conflicts with other departments	1	2	3	4	5	6	7	8	9

Part II. Instructions: For each of the job-related events listed in Part I, please indicate the approximate *number of days* during the past *6 months* on which you have personally experienced this event. Do this by circling a number from "0" to "9+" for each event. Circle "0" if the event did *not occur* during the past 6 months; circle the number "9+" for each event you experienced personally on 9 or more days during the past 6 months.

STRESSFUL JOB-RELATED EVENTS	Number of days on which the event occurred during the past 6 months									
31. Assignment of disagreeable duties	0	1	2	3	4	5	6	7	8	9+
32. Working overtime	0	1	2	3	4	5	6	7	8	9+
33. Lack of opportunity of advancement	0	1	2	3	4	5	6	7	8	9+
34. Assignment of new or unfamiliar duties	0	1	2	3	4	5	6	7	8	9+
35. Fellow workers not doing their job	0	1	2	3	4	5	6	7	8	9+
36. Inadequate support by supervisor	0	1	2	3	4	5	6	7	8	9+
37. Dealing with crisis situations	0	1	2	3	4	5	6	7	8	9+
38. Lack of recognition for good work	0	1	2	3	4	5	6	7	8	9+
39. Performing tasks not in the job description	0	1	2	3	4	5	6	7	8	9+
40. Inadequate or poor quality equipment	0	1	2	3	4	5	6	7	8	9+
41. Assignment of increased responsibility	0	1	2	3	4	5	6	7	8	9+
42. Periods of inactivity	0	1	2	3	4	5	6	7	8	9+
43. Difficulty getting along with supervisor	0	1	2	3	4	5	6	7	8	9+
44. Experiencing negative attitudes toward the organization	0	1	2	3	4	5	6	7	8	9+
45. Insufficient personnel to adequately handle an assignment	0	1	2	3	4	5	6	7	8	9+
46. Making critical on-the-spot decisions	0	1	2	3	4	5	6	7	8	9+
47. Personal insult from customer / consumer / colleague	0	1	2	3	4	5	6	7	8	9+
48. Lack of participation in policy making decisions	0	1	2	3	4	5	6	7	8	9+
49. Inadequate salary	0	1	2	3	4	5	6	7	8	9+
50. Competition for advancement	0	1	2	3	4	5	6	7	8	9+
51. Poor or inadequate supervision	0	1	2	3	4	5	6	7	8	9+
52. Noisy work area	0	1	2	3	4	5	6	7	8	9+
53. Frequent interruptions	0	1	2	3	4	5	6	7	8	9+
54. Frequent changes from boring to demanding activities	0	1	2	3	4	5	6	7	8	9+
55. Excessive paperwork	0	1	2	3	4	5	6	7	8	9+
56. Meeting deadlines	0	1	2	3	4	5	6	7	8	9+
57. Insufficient personal time (for example, coffee breaks, lunch)	0	1	2	3	4	5	6	7	8	9+
58. Covering work for another employee	0	1	2	3	4	5	6	7	8	9+
59. Poorly motivated co-workers	0	1	2	3	4	5	6	7	8	9+
60. Conflicts with other departments	0	1	2	3	4	5	6	7	8	9+

APPENDIX D. HUMAN SUBJECTS COMMITTEE APPROVAL

Information for Review of Research Involving Human Subjects

Iowa State University

(Please type and use the attached instructions for completing this form)

1. Title of Project: Quality Program Induced Change: Its Impact on Stress, Fear, and Anxiety

2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are protected. I will report any adverse reactions to the committee. Additions to or changes in research procedures after the project has been approved will be submitted to the committee for review. I agree to request renewal of approval for any project continuing more than one year.

Chester D. Ward	3-11-99	[signature]
Typed name of principal investigator	Date	Signature of principal investigator

Industrial Education and Technology	212 Trailridge Road, Ames, Iowa 50014
Department	Campus address

515-296-2139
Phone number to report results

3. Signatures of other investigators

Signatures of other investigators	Date	Relationship to principal investigator
John C. Dugger, Ph.D.	3-11-99	Major Professor
[signature]		

4. Principal investigator(s) (check all that apply)
☐ Faculty ☐ Staff X Graduate student ☐ Undergraduate student

5. Project (check all that apply)
☐ Research X Thesis or dissertation ☐ Class project ☐ Independent Study (490, 590, Honors project)

6. Number of subjects (complete all that apply)
adults, non-students: approx. 4000 # minors under 14: 0 # minors 14 - 17: 0
ISU students: 0 other (explain): 0

7. Brief description of proposed research involving human subjects: (See instructions, Item 7. Use an additional page if needed.)

The study involves organizations in Iowa and possibly Missouri that have implemented a Continuous Quality Improvement education program authored by the Center for Continuous Improvement (CCQI)located at the Iowa State University Research Park. Each of these organizations has embarked on a path to organizational change based on the concepts of continuous improvement and the team approach. This philosophy of organizational change involves, in part, the Dr. W. Edwards Deming principle of driving fear from the organization to improve individual and therefore organizational performance. Deming's concept of fear is best defined by the symptoms observed in organizations that were not achieving their full potential and were utilizing highly variable processes. Occupational stress (fear) will be measured in a random 10% sample of employees of about 40 organizations that have affiliation with CCQI using the Job Stress Survey (attached). Demographics requested: age, sex, organizational tenure, and job title. Other information such as organization size and level of quality implementation will be separately obtained.

(Please do not send research, thesis, or dissertation proposals.)

8. Informed Consent:
☐ Signed informed consent will be obtained. (Attach a copy of your form.)
X Modified informed consent will be obtained. (See instructions, item 8.)

Last name of Principal Investigator Ward

Checklist for Attachments and Time Schedule

The following are attached (please check):

12. X Letter or written statement to subjects indicating clearly:
    a) the purpose of the research
    b) the use of any identifier codes (names, #'s), how they will be used, and when they will be removed (see item 17)
    c) an estimate of time needed for participation in the research
    d) if applicable, the location of the research activity
    e) how you will ensure confidentiality
    f) in a longitudinal study, when and how you will contact subjects later
    g) that participation is voluntary; nonparticipation will not affect evaluations of the subject

13. ☐ Signed consent form (if applicable)

14. X Letter of approval for research from cooperating organizations or institutions (if applicable) See item 11.I

15. X Data-gathering instruments

16. Anticipated dates for contact with subjects:

First contact	Last contact
April 15, 1999	May 15, 1999
Month/Day/Year	Month/Day/Year

17. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:

Month/Day/Year

18. Signature of Departmental Executive Officer	Date	Department or Administrative Unit
Roger A. Smith, Ph.D.	3-11-99	Industrial Education and Technology

19. Decision of the University Human Subjects Review Committee:
☒ Project approved ☐ Project not approved ☐ No action required

Name of Committee Chairperson	Date	Signature of Committee Chairperson
Patricia M. Keith	3/21/99	

APPENDIX E. ORGANIZATION QUALITY PROGRAM IMPLEMENTATION ASSESSMENT

ORGANIZATION QUALITY PROGRAM IMPLEMENTATION ASSESSMENT

Purpose:

This instrument is designed to establish a set of guidelines for assessing the level of quality program implementation within an organization. The instrument is intended for use by multiple raters of individual organizations. Multiple raters allow for the calculation of an average assessment level and an associated inter-rater reliability for each organization assessed. The scores obtained from this instrument may be used in conjunction with other instruments that utilize level of quality program implementation as an independent variable or they may be used independently to provide organizations with an estimated assessment of their quality program implementation progress. The assessment is intended to provide an overall evaluation, but also may be used to target weak areas for improvement.

Instructions:

Please read each section to develop an understanding of the areas of concern, then rate the company based on the level/degree of quality implementation that it has demonstrated. A scoring guideline is provided to assist in assigning point values in each category. After rating the company in each of the 7 sections, complete the summary page at the end of the assessment. Additional comments should be provided at the end of each section. A sample self evaluation (Besterfield et al, 1999) is included for information and assistance in completing the assessment.

Leadership (75 pts)

Consider how senior leaders guide the company in setting direction, in developing and sustaining an effective performance system that focuses on empowerment, innovation, and learning.

Address the following:

1. consider how senior leaders provide company direction and seek future opportunities for the company

2. consider how senior leaders set, communicate and deploy organizational values, performance expectations, and a focus on creating and balancing value for customers, stockholders (if applicable), and employees

3. consider how senior leaders communicate and reinforce values, directions, expectations, customer focus and their commitment to learning throughout the workforce

4. consider how senior leaders review the organization's overall performance, and use the review process to reinforce company direction and improve the leadership system

5. consider how organizational performance review findings are translated into priorities for improvement and opportunities for innovation

Some specific areas that might be useful for the assessment are: management presentation, steering committee training, regular steering committee meetings, support of team recommendations, steering committee understanding of SPC.

Leadership Section Total: _____

Comments:

Strategic planning (45 pts)

Consider how the company sets strategic direction to better define and strengthen its competitive position, and how the strategy development process leads to an action plan and human resource plan that can be deployed and tracked for performance.

Address the following:

Strategy Development

Assess how the company develops its strategy and then translates it into action plans that clearly communicate critical requirements and how they are tracked. Areas of interest with respect to strategy development should include:

1. target customers
2. competition
3. risks
4. company capability
5. supplier/partner capability

Does the company have strategic objectives and a completion timetable? Consider how the objectives are set and how the options to assess the meeting of the objectives are chosen and evaluated.

Strategy Deployment

Assess how successful the company has been at utilizing its strategic plan deployment to achieve organizational goals and in providing performance projection measures for the near future. Consider the following:

1. Are the action plans related to the strategic objectives?
2. Are key human resource plans based on the strategic objectives and action plans?
3. Are resources appropriately allocated to accomplish the action plans?
4. Are there adequate measures for tracking performance?
5. Are the strategic objectives, action and human resource plans effectively communicated?

Some areas that might be useful for the assessment are: quality is everyone's business, quality action plans are clear and concise, strategic plan is customer driven, adequate resources to effectively employ CQI, cross functional teams are employed, time constraints are typically not applied, and quality is a corporate level initiative.

Strategic Planning Section Total: _____

Comments:

Customer and Market Focus (45 pts)

Consider how the company determines long-term requirements, expectations, and preferences of current and potential customers as well as determining and enhancing customer satisfaction.

Assess how the company develops it customer and market knowledge by addressing the following:

1. How are key product and service features determined and their relative importance to customers for the purpose of marketing and product planning?
2. How are target customers, customer groups and market segments determined?
3. How are learning methods kept current with business needs and direction?
4. Are key customer contacts determined and deployed throughout the organization as appropriate?
5. Is there an effective complaint management system?
6. Is there an effective method to build customer relationships and maintain them?
7. Is there an effective method in place to assess customer satisfaction?
8. Is there a method in place to follow up with customers on products/services to receive prompt feedback?

Some areas that might be useful for the assessment are: quality is defined by the customer, company follows up with customers on products or services, customers provide the specifications for the products/services, company listens to and learns from the customers/markets, company uses objective means to determine customer satisfaction, and company effectively manages complaints.

Customer and Market Focus Section Total: _____

Comments:

Information and Analysis (45 pts)

Consider how the company analyzes and reviews overall performance to assess the progress relative to the planned strategy and to identify key areas for improvement. Also address how the company selects and utilizes data as a means to assess its own performance.

Address the following:

Measurement of Organizational Performance

Assess how the organization addresses the major components of an effective performance measurement system. Consider the following:

1. selection of measures/indicators and the extent and effectiveness of their use
2. completeness of data to track overall organizational performance
3. selection, and extent and effectiveness of use of comparative data and information
4. correlation and projection of data to support planning
5. plan to keep performance measurement system current with business needs and direction

Analysis of Organizational Performance

Assess how the organization analyzes performance data and information to understand overall organizational performance.

Some areas that might be useful for the assessment are: quality is effectively measured, SPC tools are used, SPC tools are used effectively, the problem solving model is appropriately utilized, and data are correctly collected for analysis.

Information and Analysis Section Total: _____

Comments:

Human Resource Development and Management (45 pts)

Consider how the company encourages all employees to effectively contribute to achieving the organizational performance and learning objectives through work and job design and compensation and recognition programs. Also assess how the company education and training programs address key organizational plans as well as contributing to improved employee performance and development. Work environment and climate that support employee well-being, satisfaction and motivation are also areas that should be considered.

Address the following:

Work and Job Design

Opportunities for individual initiative and self-directed responsibility in designing, managing, and improving work processes are provided. Flexibility and rapid response plans exist to manage current and changing customer requirements. Effective communications are present across work functions, units and locations. Consider organizational practices that encourage and motivate employees to develop and utilize their full potential.

Compensation and Recognition

Compensation and recognition programs for individuals and groups, at all levels, reinforce the overall work system, performance and learning objectives.

Employee Education, Training, and Development

Assess how the company provides education and training to meet short and long term development needs for both the organization and the employees. An evaluation of how the organization determines if the training and education programs should be included and the optimum delivery methods to be used. Is there a means to address performance excellence in education and training and are all employees provided training on use of performance measurement tools?

Some areas that might be useful for this assessment are: employees are trained in the SPC problem solving process, teams are using group discussion and communication techniques, employees are empowered to implement CQI efforts, teams are recognized for achievements, and employees are supportive of change.

Human Resource Development and Management Section Total: _____

Comments:

Process Management (45 pts)

Consider how new, significantly modified, and specialized products and services are designed. Also assess the design, implementation, and improvement of production/delivery processes.

Address the following:

Product and Service Processes

1. incorporation of customer requirements into product and service design
2. use of performance measures to control and improve the processes

Supplier and Partnering Processes

1. incorporation of performance requirements and measurements into supplier process management
2. methods used to minimize overall costs associated with inspection and test procedures
3. efforts to provide assistance to suppliers to support their overall organizational improvement

Some areas that might be useful for this assessment are: incorporation of changing customer requirements, design of production/delivery processes to quality requirements, evaluation of product and service processes to achieve improved performance and the transfer of learning to other organizations, and joint planning with suppliers.

Process management Section Total: _____

Comments:

Quality Implementation Results (200 pts)

Consider how satisfied the internal and external customers are with the results achieved by the implementation of quality programs within the organization, how the financial performance of the organization has changed, the success of the supplier/partner changes, and organizational success at achieving published goals.

Address the following:

Customer Focused Results

1. customer satisfaction/dissatisfaction
2. customer loyalty
3. trends in product and service performance

Financial and Market Results

Human Resource Results

Supplier and Partner Results

Some areas that might be useful for this assessment are; changes in cycle time, CQI efforts meet organizational expectations, employee turnover, level of throughput, operating expense, inventory, profitability and cost benefit.

Quality Implementation Results Section Total: _____

Comments:

Degree of Quality Program Implementation Summary

Worksheet

Leadership (75 pts)	_____
Strategic Planning (45 pts)	_____
Customer and Market Focus (45 pts)	_____
Information and Analysis (45 pts)	_____
Human Resources Development and Management (45 pts)	_____
Process Management (45 pts)	_____
Quality Implementation Results (200 pts)	_____
Total (500 pts)	_____

Scoring Guidelines

Score	Approach/Deployment
0%	•no systematic approach evident.
10% to 20%	•beginning of a systematic approach with major gaps in the basic purpose of the section. •early stages of transition from reactive to proactive approach.
30% to 40%	•sound systematic approach that has been deployed responsive to basic purpose, some work unit in early stages. •beginning of systematic approach to evaluation and basic process improvement.
50% to 60%	•sound systematic approach responsive to the overall purpose of the section effectively deployed with some variation between units. •fact based, systematic evaluation and improvement process in place for basic processes and aligned with organizational needs.
70% to 80%	•sound systematic approach that is responsive to multiple requirements and is well deployed with no significant gaps. •fact-based systematic evaluation and improvement process in place with organization learning and sharing as key management tools. •evidence of refinement and improved integration as a result of organization-level analysis.
90% to 100%	•sound systematic approach that is responsive to all requirements and is fully deployed without significant weaknesses or gaps in any area. •very strong fact-based systematic evaluation and improvement process that includes extensive organizational learning/sharing as key management tools. •strong refinement and integration backed by excellent analysis.

Scoring Guidelines

Score	Results
0%	•no or poor results in areas reviewed.
10% to 20%	•some improvements and/or good performance in some areas. •effective results not evident for many to most of the areas of significant importance to key business requirements.
30% to 40%	•improvements and/or good performance in many important areas. in early stages of trend development and comparative research. •effective results evident in many to most of the areas of significant importance to key business requirements.
50% to 60%	•improvements and/or good performance in most important areas. •no pattern of adverse trends or poor performance in important areas. •some trends evaluated against relevant comparisons show areas of strength and business results address most key customer and process requirements.
70% to 80%	•current performance in key business requirements is good to excellent. •most improvement trends and performance levels are sustained. •many to most evaluated trends and/or current performance levels show areas of leadership and very good relative performance levels. •business results address most key customer and process requirements.
90% to 100%	•current performance is excellent in key business requirements. •excellent improvement trends and/or sustained excellent performance levels in most areas. •evidence of industry and benchmark leadership demonstrated in many areas. •business results fully address key customer, process, and action plan results.

Sample Self Evaluation[1]

1. Leadership

_____Senior executives are actively and personally involved in the developing the quality goals and standards for the organization, communicating these goals, planning for quality, and supervising its implementation and progress.
All levels of management demonstrate through their words and actions that quality is the first priority within the organization.
_____There is a willingness to assist departments and individual employees to improve.
_____The organization operates in a manner consistent with a high sense of ethics, concern for public health, and concern for the environment.
_____There is a system to evaluate the effectiveness of leadership.

2. Strategic Planing

_____There is an effective short-range (one to two years) plan for implementing TQM.
_____There is an effective long-range (three or more years) for leadership in quality and customer satisfaction.
_____The information in the plans is adequately disseminated within the organization.
_____There is a program to evaluate and improve the planning process.
_____Future customer requirements are routinely evaluated.

3. Customer and Market Focus

_____Strategies have been developed to maintain and build customer relationships.
_____There is an effective means to determine customer expectations.
_____Customer expectations are effectively communicated to the work force.
_____Methods are in place to measure the level of customer satisfaction.
_____There are procedures to effectively handle customer complaints.
_____There are procedures to effectively handle customer inquiries.
_____Management visits customer sites in order to better understand requirements.
_____Management visits suppliers in order to better establish requirements and to help understand/alleviate any constraints.
_____Internal customer communications are effective.

4. Information and Analysis

_____An accurate and timely database exists to provide information on customers, internal operations, organizational performance, costs and finances.
_____Information/data collected is pertinent to the improvement effort.
_____Information/data that is collected is used for improvement.

---

[1] Adapted from Besterfield, D. H., Besterfield-Michna, C., Besterfield, G. H., & Besterfield-Sacre, M. (1999). 2 nd. ed. Total Quality Management. Upper Saddle River, New Jersey: Prentice-Hall, Inc. pp. 166-169.

5. Human Resources Focus

_____Human resource and management plans support continuous quality improvement.
_____The training program stresses quality improvement, teamwork, and structured problem solving using SPC.
_____The training program is open to all employees.
_____Training programs for employee advancement is provided in addition to CQI training.
_____Employees are involved in process improvement and are encouraged to make recommendations for change.
_____Employees and teams are recognized for their contributions.
_____There is a positive work environment.
_____Job sites are evaluated regularly for improvement.

6. Process Management

_____Organizational processes have been identified and flow charted.
_____The Steering Committee is being effectively used to prioritize process improvement.
_____SPC is effectively used to measure process performance.
_____Processes that need improvement have been identified and are part of an improvement plan.
_____Information/results developed in team sessions are made available to all employees.
_____Quality expectations are effectively communicated to all suppliers.
_____SPC techniques are used to monitor suppliers.
_____The organization monitors the operation of its CQI program.

7. Business Results.

<u>There has been quantifiable improvement in the following areas where applicable:</u>

_____Safety/number of worker compensation claims
_____Employee satisfaction/absenteeism/turnover
_____Supplier satisfaction with organizational performance
_____On-time performance
_____Reduced delivery time
_____Financial return
_____Rework
_____Supplier quality
_____Process improvement
_____Customer satisfaction
_____Repeat business
_____Market share

APPENDIX F. PERMISSION TO ADMINISTER THE JSS

Permission to Administer the Job Stress Survey

Date:_____

Chester D. Ward has permission to administer or have administered the Job Stress Survey to employees associated with this organization.

_____

Title:

_____

Organization

APPENDIX G. ORGANIZATIONAL SPECIFIC INFORMATION

ORGANIZATION LIST by IDENTIFICATION NUMBER

ID NUMBER	NUMBER of EMPLOYEES	TARGET SAMPLE	ACTUAL SAMPLE	QUALITY ASSESS SCORE
1	27	26	26	297
2	28	27	17	318
3	45	40	36	386
4	56	45	47	370
5	*	*	*	428
6	68	57	40	458
7	70	62	22	95
8	72	60	49	244
9	72	60	63	260
10	82	67	46	320
11	100	80	85	230
12	150	106	117	255
13	160	112	89	305
14	*	*	*	*
15	190	127	104	176
16	190	127	56	380
17	216	138	76	245
18	223	141	84	88
19	250	152	173	370
20	*	*	*	458
21	300	165	187	445
22	331	173	68	230
23	549	224	84	375
24	1265	294	167	395
25	1950	315	160	142
Total	6394	2598	1796	
26	15	15	15	0
27	20	20	18	0
28	146	117	29	0
Total	181	152	62	

*Missing values due to organization withdrawing after data collection began.

JOB STRESS RESULTS for each ORGANIZATION

ORG ID Number	N	Mean JS-X	Sd JS-X	Mean JP-X	Sd JP-X	Mean LS-X	Sd LS-X
1.	26	13.24	4.96	18.29	7.25	10.98	8.14
2.	17	22.89	9.36	24.71	11.06	22.90	13.24
3.	36	22.16	11.52	24.34	13.26	20.46	13.17
4.	47	21.87	13.48	23.86	14.31	21.65	15.54
6.*	40	20.66	10.85	21.72	13.67	21.72	14.60
7.	22	27.72	18.55	28.45	19.67	29.10	23.51
8.	48	18.68	9.99	20.56	10.54	19.29	14.70
9.	63	18.97	11.93	16.97	12.60	21.09	14.96
10.	46	18.63	9.74	19.24	8.9	20.35	15.55
11.	85	16.85	10.09	17.46	11.35	16.77	12.77
12.	117	20.35	12.36	18.42	13.48	23.36	17.27
13.	89	20.69	12.34	17.86	10.95	24.61	19.42
15.*	104	16.34	9.06	19.70	11.86	14.68	11.37
16.	56	23.46	11.55	21.05	12.07	26.47	15.83
17.	76	21.23	11.29	23.30	14.09	19.60	13.41
18.	84	21.58	10.87	22.02	11.25	24.00	16.24
19.	173	21.02	9.70	21.37	11.48	22.24	13.52
21.*	185	20.88	11.19	21.42	13.54	22.01	13.86
22.	68	20.95	10.22	21.02	11.82	19.73	14.06
23.	84	22.35	11.97	22.79	13.78	23.04	16.18
24.	167	19.86	11.18	22.32	13.53	18.77	15.16
25.	159	23.49	10.83	24.99	13.99	23.35	14.15
26.**	15	21.74	9.59	30.17	14.69	15.69	12.84
27.	18	25.18	10.12	25.78	11.64	25.49	11.92
28.	28	19.41	12.44	24.79	15.54	16.92	16.90

*Missing ID number due to organization deciding not to participate after granting permission to conduct the study.

**ID numbers 26, 27 and 28 represent the organizations originally planned to be the control group.

APPENDIX H. LETTER OF INTRODUCTION

April , 1999

«title» «fname» «lname»
«position»
«company»
«address1»
«address2»
«city», «state» «zip»

Dear «suffix»,

This letter is to inform you about a unique opportunity for your company. As you know CCQI is an advocate of the Deming management philosophy and his 14 management principles that are a large part of the quality movement in this country. While it is clear that the 14 principles seem to be based on statistical evidence, there is no documentation to support this. The Center is therefore supporting research into the validity of Dr. Deming's 14 principles, specifically the concept that quality program implementation will be instrumental in driving fear from an organization.

At the present time the Center for Continuous Quality Improvement has the advantage of having Douglas Ward, an Iowa State University doctoral candidate, on staff as a research associate. Mr. Ward's dissertation includes conducting a survey that will provide data for establishing a correlation between Continuous Improvement and occupational stress, what Dr. Deming called fear in the workplace.

Since your organization has been a CCQI client you will be able to participate in this study. An associate will be made available to administer the survey to approximately 25% to 80% of your employees at a time that is convenient for you. The results of the study will be made available to you when Mr. Ward's dissertation is published.

Mr. Ward will be sending you a letter requesting your participation in the study. The survey has been approved by his doctoral committee, of which I am a part. I believe that the information derived from this research will be of benefit to you in further developing your quality programs as well as others involved with CCQI in the quality effort.

Thank you for supporting Mr. Ward and the Center in our efforts to better serve you.

Sincerely yours,

Robert J. Gelina, Ph.D.
Director

APPENDIX I. LETTER OF REQUEST TO CONDUCT RESEARCH

212 Trailridge Road
Ames, Iowa 50014
April 1999

<Company Name>

Dear

As a Research Associate affiliated with the Center for Continuous Quality Improvement I am currently involved in research that is intended to assess the impact of the Center's Continuous Quality Improvement education program on the level of occupational stress, defined as fear by Dr. Deming, in organizations.

As you know, Dr. W. Edwards Deming, expressed the key aspects of his management method with Fourteen Points. Point 8 is "Drive Out Fear". In this point Dr. Deming suggests that people in the typical organization are not only afraid to point out problems but in many cases are afraid to ask questions about what might be right or wrong with their jobs or the organizations. He says that this workplace fear stems from concern over the possibility of job loss, and lost promotions or raises. In general the employees are afraid of some form of retaliation if they ask too many questions or offer ideas that might contribute to the company. One of the key outcomes of implementing continuous quality improvement must then be a reduction in workplace fear within the organization. It is the intent of this research to show that this correlation exists.

I am seeking permission to administer a survey to 25% to 80% of your employees selected at random. The survey will take between 10 and 15 minutes to complete and will be completely confidential since the data compiled from your organization will be coded so as to only allow organizational analysis at the lowest level. I will share the outcome of the research with you with the expectation that it would assist your organization by providing insight into the level of stress and its major contributors.

I will be contacting you within the next few days to discuss this request and will make arrangements to select the respondents and to administer the survey at the same time if appropriate. Please complete the enclosed permission statement and return it to me in the enclosed envelope. Should you have questions concerning this request I may be reached at 515-296-2139 or 515-296-9796. Thank you for your support in conducting this research.

Sincerely,

Chester D. Ward

Encl: Permission Statement

Permission to Administer the Job Stress Survey

Date:_____

Chester D. Ward has permission to administer or have administered the Job Stress Survey to employees associated with this organization.

_____

Title:

_____

Organization

APPENDIX J. STATISICAL ANALYSIS SYSTEM (SAS) PROGRAM

SAS Program Used as Basis for Data Analysis

```
libname survey '.';
data survey.survey;
infile "BIL386A.QS" firstobs = 2;
input #1 sequence 2-5
        id      26-27
        qualimp  32-34
        dept    35-35
        tenure   36-37
        jobtype  39-39
        sex  $   52-52
        educ    53-54
      @46 bdate $char6.
      #2 @6 (a1 - a60) (1.);

data survey.survey; set survey.survey;
if substr(bdate,1,2) = "  " then substr(bdate,1,2) = "06";
if substr(bdate,3,2) = "  " then substr(bdate,3,2) = "15";
if substr(bdate,5,1) = "  " then bdate = "      ";
if substr(bdate,6,1) = "  " then bdate = "      ";

if (substr(bdate,2,1) ^= " " and substr(bdate,1,1) = " ") then substr(bdate,1,1) = "0";
if (substr(bdate,4,1) ^= " " and substr(bdate,3,1) = " ") then substr(bdate,3,1) = "0";
if (substr(bdate,3,1) ^= " " and substr(bdate,4,1) = " ") then substr(bdate,4,1) = "0";

org_size = "small";
if id >= 12 then org_size = "large";

job=0;
if jobtype = 1 then job = 1; else job = 0;

/*
proc print data = survey;
run;
*/
/*
proc print data = survey.survey; var a2; run;
*/

data _null_;
set survey.survey;
testdate = "072999";
file "temp.dward";
```

```
 put @1 sequence  4.
    @6 bdate    $char6.
    @13 testdate $char6.;

 data dates;
 infile "temp.dward";
 input sequence bdate mmddyy6. @13 testdate mmddyy6.;

 proc sort data = dates; by sequence;
 proc sort data = survey.survey; by sequence;
 run;

 data survey.survey; merge survey.survey(drop = bdate) dates;
 by sequence;
 age = (testdate - bdate) / 365.25;
 if age < 16 then age = .;

 data survey.survey; set survey.survey;
 array ans{60} a1-a60;

 js_x_n = 0;
 js_s_n = 0;
 js_f_n = 0;

 js_x = 0;
 js_s = 0;
 js_f = 0;
 do i = 1 to 30;
   if (ans[i] ne . and ans[i+30] ne .) then do;
     js_x = js_x + ans[i]*ans[i+30];
     js_x_n = js_x_n + 1;
   end;

   if (ans[i] ne .) then do;
     js_s = js_s + ans[i];
     js_s_n = js_s_n + 1;
   end;

   if (ans[i+30] ne .) then do;
     js_f = js_f + ans[i+30];
     js_f_n = js_f_n + 1;
   end;

 end;
```

```
if js_x_n > 0 then js_x = js_x / js_x_n;
else js_x = .;

if js_s_n > 0 then js_s = js_s / js_s_n;
else js_s = .;

if js_f_n > 0 then js_f = js_f / js_f_n;
else js_f = .;

jp_x = 0;
jp_x_n = 0;
do i = 4,7,9,11,16,23,24,25,26,27;
  if(ans[i] ne . and ans[i+30] ne .) then do;
    jp_x_n = jp_x_n + 1;
    jp_x = jp_x + ans[i]*ans[i+30];
  end;
end;

if jp_x_n > 0 then jp_x = jp_x / jp_x_n;
else jp_x = .;

jp_s = 0;
jp_s_n = 0;
do i = 4,7,9,11,16,23,24,25,26,27;
  if(ans[i] ne .) then do;
    jp_s_n = jp_s_n + 1;
    jp_s = jp_s + ans[i];
  end;
end;

if jp_s_n > 0 then jp_s = jp_s / jp_s_n;
else jp_s = .;

jp_f = 0;
jp_f_n = 0;
do i = 4,7,9,11,16,23,24,25,26,27;
  if(ans[i+30] ne .) then do;
    jp_f_n = jp_f_n + 1;
    jp_f = jp_f + ans[i+30];
  end;
end;

if jp_f > 0 then jp_f = jp_f / jp_f_n;
```

```
else jp_f = .;

ls_x = 0;
ls_x_n = 0;
do i = 3,5,6,8,10,13,14,18,21,29;
  if(ans[i] ne . and ans[i+30] ne .) then do;
    ls_x_n = ls_x_n + 1;
    ls_x = ls_x + ans[i]*ans[i+30];
  end;
end;

if(ls_x_n > 0) then ls_x = ls_x / ls_x_n;
else ls_x = .;

ls_s = 0;
ls_s_n = 0;
do i = 3,5,6,8,10,13,14,18,21,29 ;
  if(ans[i] ne .) then do;
    ls_s_n = ls_s_n + 1;
    ls_s = ls_s + ans[i];
  end;
end;

if(ls_s_n > 0) then ls_s = ls_s / ls_s_n;
else ls_s = .;

ls_f = 0;
ls_f_n = 0;
do i = 3,5,6,8,10,13,14,18,21,29;
  if(ans[i+30] ne .) then do;
    ls_f_n = ls_f_n + 1;
    ls_f = ls_f + ans[i+30];
  end;
end;

if ls_f_n > 0 then ls_f = ls_f / ls_f_n;
else ls_f = .;

/* these are necessary for calculating individual
  js scores for each observation
*/
data survey.survey; set survey.survey;
array ans{60} a1-a60;
js1 = a1*a31; js2 = a2*a32; js3 = a3*a33; js4 = a4*a34; js5 = a5*a35;
```

```
js6 = a6*a36; js7 = a7*a37; js8 = a8*a38; js9 = a9*a39; js10 = a10*a40;
js11 = a11*a41; js12 = a12*a42; js13 = a13*a43; js14 = a14*a44; js15 = a15*a45;
js16 = a16*a46; js17 = a17*a47; js18 = a18*a48; js19 = a19*a49; js20 = a20*a50;
js21 = a21*a51; js22 = a22*a52; js23 = a23*a53; js24 = a24*a54; js25 = a25*a55;
js26 = a26*a56; js27 = a27*a57; js28 = a28*a58; js29 = a29*a59; js30 = a30*a60;

/* this section creates the information on table 1 */
*proc sort data = survey.survey;
*by jobtype sex;

*proc corr data = survey.survey alpha nomiss;
*title "Table 1 informaton";
*var js_x js_s js_f;
*by jobtype sex;
*run;

/*
proc corr data=survey.survey alpha nomiss;
title "Reliability for JSS";
var a1 a2 a3 a4 a5 a6 a7 a8 a9 a10 a11 a12 a13 a14 a15
a16 a17 a18 a19 a20 a21 a22 a23 a24 a25 a26 a27 a28 a29 a30;
run;

proc corr data=survey.survey alpha nomiss;
title "Reliability for JSF";
var a31 a32 a33 a34 a35 a36 a37 a38 a39 a40 a41 a42 a43 a44 a45
a46 a47 a48 a49 a50 a51 a52 a53 a54 a55 a56 a57 a58 a59 a60;
run;

proc corr data=survey.survey alpha nomiss;
title "Reliability for JPS";
var a4 a7 a9 a11 a16 a23 a24 a25 a26 a27;
run;

proc corr data=survey.survey alpha nomiss;
title "Reliability fof JPF";
var a34 a37 a39 a41 a46 a53 a54 a55 a56 a57;
run;

proc corr data=survey.survey alpha nomiss;
title "Reliability for LSS";
var a3 a5 a6 a8 a10 a13 a14 a18 a21 a29;
run;
```

```
proc corr data=survey.survey alpha nomiss;
title "Reliability for LSF";
var a33 a35 a36 a38 a40 a43 a44 a48 a51 a59;
run;
*/

/* this section creates the information on table 2 */
*proc sort data = survey.survey;
*by jobtype sex;

*proc corr data = survey.survey alpha nomiss;
*title "Table 2 information";
*var jp_x jp_s jp_f;
*by jobtype sex;
*run;

/* this section creates the information on table 3 */
*proc sort data = survey.survey;
*by jobtype sex;

*proc corr data = survey.survey alpha nomiss;
*title "Table 3 information";
*var ls_x ls_s ls_f;
*by jobtype sex;
*run;

*proc sort data = survey.survey;
*by sex;

*proc means data = survey.survey;
*by sex;
*var js_x a1-a60;
*output out = meansout;
*run;

/* this section creates the information on table 4 */

*proc sort data = survey.survey;
*by sex;

*proc means data = survey.survey N mean std;
*title "Table 4 information";
*var js1-js30 a1-a60;
*by sex;
```

```
*run;

/* this section creates the information on table 5 */

*proc sort data = survey.survey;
*by jobtype sex;

*proc means data = survey.survey N mean std;
*title "Table 5 information";
*var js1-js30 a1-a60;
*by jobtype sex;
*run;

proc glm data=survey.survey;
class jobtype sex org_size;
model js_x=jobtype sex org_size educ tenure qualimp age
      jobtype*sex jobtype*org_size sex*org_size jobtype*sex*org_size
      educ*tenure educ*qualimp educ*age tenure*qualimp tenure*age
      qualimp*age/solution;
means jobtype sex org_size
      jobtype*sex jobtype*org_size sex*org_size
      jobtype*sex*org_size/bon scheffe;
run;

proc glm data=survey.survey;
class jobtype sex org_size;
model js_x=jobtype sex org_size educ tenure qualimp age/solution;
means jobtype sex org_size;
run;

proc glm data=survey.survey;
class job sex org_size;
model js_x=job sex org_size educ tenure qualimp age
      job*sex job*org_size sex*org_size job*sex*org_size
      educ*tenure educ*qualimp educ*age tenure*qualimp tenure*age
      qualimp*age/solution;
means job sex org_size
      job*sex job*org_size sex*org_size
      job*sex*org_size/bon scheffe;
run;

proc glm data=survey.survey;
class job sex org_size;
model js_x=job sex org_size educ tenure qualimp age/solution;
means job sex org_size;
run;
```

APPENDIX K. ROTATED FACTOR PATTERNS FOR JSS STRESS INDEX, SEVERITY ITEMS, AND FREQUENCY ITEMS

Table K.1: Rotated factor pattern for the severity items from 1724 CCQI client respondents

QUESTION	FACTOR1	FACTOR2	FACTOR3	FACTOR4	FACTOR5	FACTOR6	FACTOR7
A1	-0.17689	0.13782	0.05551	0.00204	0.13722	0.05481	0.90097
A2	0.17173	0.04543	0.24115	-0.06677	0.43575	-0.29705	-0.16465
A3	-0.15990	-0.10915	0.87298	-0.03671	0.07633	0.00599	0.00590
A4	-0.00493	-0.07801	0.09779	0.17071	0.71456	0.04840	0.06186
A5	-0.08121	0.83357	-0.08523	0.02294	0.05767	-0.00551	0.09544
A6	-0.23924	0.37552	0.04665	0.26156	0.20341	0.28308	-0.15068
A7	0.05592	-0.06137	-0.12727	0.59787	0.44494	-0.09330	0.00560
A8	-0.12186	0.21252	0.48863	0.00949	0.20684	0.08794	-0.05680
A9	0.10025	0.16093	0.17018	-0.27402	0.61836	0.10347	0.12917
A10	0.02519	0.25222	0.10238	0.08530	0.14479	0.21987	0.11497
A11	0.19107	0.01476	0.01745	0.01441	0.70742	-0.03521	0.06117
A12	0.13625	0.00106	-0.04227	0.03802	-0.11344	0.79019	0.12837
A13	-0.10567	0.09811	0.04144	0.53317	0.05271	0.32508	-0.15931
A14	0.00453	0.29868	0.26335	0.31536	-0.04034	0.09292	0.05044
A15	0.11053	0.36864	0.08216	0.37980	0.11748	-0.13780	-0.03737
A16	0.22703	-0.22199	-0.01661	0.53416	0.41158	0.01487	0.11002
A17	0.04597	-0.01467	0.09665	0.72077	-0.11674	0.05237	0.00161
A18	0.12571	0.09279	0.43950	0.35189	-0.11453	0.03750	0.00879
A19	0.07951	0.04025	0.78459	0.03586	-0.06714	-0.15868	0.03112
A20	0.18015	-0.16371	0.65284	0.14355	-0.00936	0.11921	0.08242
A21	0.07331	0.26252	-0.00169	0.12854	0.08403	0.45631	-0.22469
A22	0.64979	-0.08421	0.08937	-0.15651	-0.00655	0.36702	-0.14438
A23	0.70270	0.08281	-0.07359	0.06671	0.04439	0.08587	-0.12282
A24	0.60784	-0.09292	0.02311	-0.04471	0.13820	0.40992	0.07959
A25	0.52154	0.13131	-0.09642	0.22147	0.05925	-0.07599	-0.00696
A26	0.53323	0.02900	-0.08126	0.25999	0.21098	-0.07104	-0.00106
A27	0.43892	0.11963	0.21481	0.03645	0.07594	-0.12438	-0.12400
A28	0.36273	0.60955	-0.03166	-0.15054	0.13259	-0.06847	0.01286
A29	0.15992	0.86835	-0.06888	-0.03877	-0.17536	0.06219	0.05630
A30	0.23926	0.34226	0.10351	0.38856	-0.22838	0.04459	0.14313

Table K.2: Rotated factor pattern for the frequency items from 1681 CCQI client respondents

QUESTION	FACTOR1	FACTOR2	FACTOR3	FACTOR4	FACTOR5	FACTOR6
A31	0.08228	0.26804	0.09066	-0.04250	0.47072	-0.04828
A32	0.50420	-0.07199	-0.13960	0.15716	0.08962	-0.13843
A33	-0.04215	-0.00846	0.82612	-0.12997	-0.02318	0.00245
A34	0.08037	0.03649	-0.09591	-0.16788	0.80066	0.08686
A35	0.00097	0.11468	-0.11446	0.82952	-0.02644	0.00894
A36	-0.03861	0.86965	-0.08201	0.07856	0.06767	-0.03820
A37	0.67358	0.20808	0.01903	-0.12421	0.01926	0.04585
A38	0.07865	0.41380	0.38865	0.03175	0.01347	-0.05184
A39	0.27397	0.08255	0.11654	0.03760	0.37138	0.01461
A40	-0.25819	0.00813	0.14853	0.26129	0.41871	0.21406
A41	0.23213	-0.05104	0.04912	0.09978	0.61236	-0.05667
A42	-0.18209	0.13993	0.04814	-0.01176	-0.03270	0.77177
A43	-0.01598	0.85966	-0.00980	-0.09196	0.02519	0.01819
A44	0.11111	0.23734	0.26021	0.29493	-0.13700	0.05423
A45	0.26211	0.06638	0.10206	0.38867	0.09263	-0.17526
A46	0.76038	0.06138	-0.00505	-0.05937	-0.04550	0.13228
A47	0.19053	0.34329	0.18599	0.02103	-0.06870	0.07905
A48	0.13364	0.15937	0.49494	0.03126	-0.01173	0.08716
A49	-0.06624	-0.16539	0.75691	0.16423	0.05250	-0.09384
A50	-0.08509	0.02723	0.70787	-0.09202	0.08592	0.08934
A51	-0.10496	0.80943	-0.07735	0.15038	0.07487	-0.01054
A52	-0.05058	-0.14584	0.01226	0.33758	0.23691	0.35425
A53	0.65443	-0.06975	-0.16816	0.15685	0.04658	0.21230
A54	0.30090	-0.10139	-0.01225	0.00639	0.07813	0.69338
A55	0.71062	0.00009	0.03883	-0.08270	0.03544	-0.11784
A56	0.71000	-0.12823	0.01392	0.03922	-0.02040	0.03457
A57	0.37738	0.01160	0.15602	0.09702	0.12742	-0.16348
A58	0.16735	-0.01608	-0.01583	0.65694	0.04101	-0.02711
A59	-0.04931	0.05582	0.03625	0.84307	-0.10817	0.06770
A60	0.26030	0.14690	0.26130	0.18015	-0.15130	0.09893

Table K.3: Rotated factor pattern for the JSS stress index items from 1622 CCQI client respondents

QUESTION	FACTOR1	FACTOR2	FACTOR3	FACTOR4	FACTOR5	FACTOR6	FACTOR7
JS1	0.08423	0.12944	0.12478	-0.00143	0.49632	-0.06333	-0.02316
JS2	0.54333	0.02580	-0.02321	0.00623	0.09025	-0.23115	0.15911
JS3	-0.07883	0.89299	-0.01230	-0.15601	-0.03960	0.02275	-0.02725
JS4	0.04889	-0.17403	0.02008	-0.08769	0.76913	0.10083	-0.10347
JS5	-0.06336	-0.11482	0.01934	0.94893	0.00268	-0.04156	-0.07180
JS6	-0.02202	-0.01495	0.87979	0.02745	0.04453	-0.02826	-0.01268
JS7	0.63090	-0.02998	-0.02197	-0.01993	0.16143	0.04171	-0.28822
JS8	0.06355	0.44788	0.34963	0.04187	0.02471	-0.02947	-0.06495
JS9	0.03225	0.17235	0.04639	0.11178	0.55466	0.00134	0.03450
JS10	-0.12828	0.15463	0.06313	0.14757	0.28379	0.20892	0.32536
JS11	0.21772	0.07760	-0.06677	0.07565	0.63403	-0.06598	0.05038
JS12	-0.30068	0.04886	0.06388	0.02810	0.00483	0.79014	0.05824
JS13	0.00656	-0.02423	0.86549	-0.13089	0.05757	0.00255	-0.08719
JS14	0.17926	0.33126	0.23866	0.27038	-0.16555	0.01307	-0.00079
JS15	0.42902	0.08513	0.18799	0.26014	0.04512	-0.18328	0.10015
JS16	0.70547	-0.00410	-0.08519	-0.04420	0.09139	0.10754	-0.20963
JS17	0.08493	0.11035	0.17240	0.15258	0.11528	0.10180	-0.42058
JS18	0.16209	0.51164	0.16424	0.04293	-0.06553	0.03116	-0.12938
JS19	0.01447	0.77060	-0.09059	0.02031	0.00865	-0.09396	0.21240
JS20	-0.17775	0.70799	-0.10125	-0.05084	0.19433	0.13539	-0.00815
JS21	-0.04680	-0.06779	0.85150	0.05450	-0.01578	0.07637	0.08951
JS22	0.25215	0.03289	-0.00940	0.03951	-0.05930	0.42689	0.61484
JS23	0.74601	-0.17571	0.03223	0.02582	-0.05776	0.18560	0.21874
JS24	0.26968	0.00871	-0.02870	-0.07554	0.04936	0.69050	0.19398
JS25	0.70396	-0.01309	0.06442	-0.06712	-0.01155	-0.15627	0.01211
JS26	0.74598	-0.03539	-0.07114	-0.01921	0.01935	0.04011	-0.03812
JS27	0.47888	0.13049	0.10059	-0.05668	0.00500	-0.04299	0.30186
JS28	0.09815	-0.05723	-0.06933	0.71618	0.17704	-0.03080	0.05193
JS29	-0.09429	0.00639	-0.01615	0.92671	-0.05913	0.04867	-0.01554
JS30	0.24923	0.27369	-0.04240	0.28472	-0.14704	0.14959	-0.27607

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